POINT EIGHT POWER
Controlling the Power You Generate

HEALTH AND SAFETY MANUAL	
Title: Slings and Rigging Equipment for Material Handling	
Approved by: Greg Savoy	Rev. 1/1/08

1 Purpose/Scope:

This program is to be used to ensure a safe work environment during lifting operations utilizing slings and rigging equipment. This program applies to material handling equipment for the movement of material by hoisting loads using slings and other rigging equipment.

This program is applicable to all Company employees directly involved with or assisting in the selection, use, and inspections of slings and rigging equipment. This section applies to slings used in conjunction with other material handling equipment for the movement of material by hoisting. The types of slings covered are those made from alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope (conventional three strand construction), and synthetic web (nylon, polyester, and polypropylene).

2 Definitions / Responsibilities:

2.1 Definitions:

2.1.1 Designated person - selected or assigned employee or contractor representative that is qualified to perform specific duties.

2.1.2 Equivalent entity - a person or organization (including an employer) which, by possession of equipment, technical knowledge and skills, can perform with equal competence the same repairs and tests as the person or organization with which it is equated.

2.1.3 Hitch - a sling configuration whereby the sling is fastened to an object or load, either directly to it or around it.

2.1.4 Proof test - a nondestructive tension test performed by the sling manufacturer or an equivalent entity to verify construction and workmanship of a sling.

2.1.5 Rated capacity or working load limit - the maximum working load permitted by the provisions of this section.

2.1.6 Sling - an assembly, which connects the load to the material handling equipment.

2.1.7 Sling manufacturer - a person or organization that assembles sling components into their final form for sale to users.

2.1.8 Rigging - refers to both of the following:

- ❑ The hardware and equipment used to safely attach a load to a lifting device.
- ❑ The art or process of safely attaching a load to a hook by means of adequately rated and properly applied slings and related hardware.

2.2 Responsibilities:

2.2.1 Manager /Supervisor shall ensure that before use, each new, repaired, or reconditioned piece of rigging equipment has been proof tested by a qualified vendor.

- ❑ The record or certificate of the proof test shall be retained and shall be available for examination

2.2.2 Manager/Supervisor shall ensure:

- ❑ Employees working with slings are trained in procedures and inspection of slings used in their work area.

2.2.3 Employees shall follow the procedures of this written program including:

- ❑ Inspection of slings prior to use,
- ❑ Tagging defective slings, and
- ❑ Removing defective slings from the work area.

3 Requirements:

3.1 Inspections:

3.1.1 The employee, prior to use, shall visually inspect all slings.

- ❑ In addition, shackles, turnbuckles, eyebolts, links, rings, metal clamps, and other similar rigging hardware shall be checked for safety.

3.1.2 Inspection requirements are described in the Sling inspection Procedures included as Exhibit S-6.1.

3.1.3 Additionally inspections shall be performed during sling use, where service conditions warrant.

3.1.4 Damaged or defective slings shall be immediately removed from service.

3.2 Safe Operating Practices:

3.2.1 Slings that are damaged or defective shall not be used.

3.2.2 Slings shall not be shortened with knots or bolts or other makeshift devices.

3.2.3 Sling legs shall not be kinked.

3.2.4 Slings shall not be loaded in excess of their rated capacities.

3.2.5 Slings used in a basket hitch shall have the loads balanced to prevent slippage.

3.2.6 Slings shall be securely attached to their loads.

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

3.2.8 Suspended loads shall be kept clear of all obstructions.

3.2.9 All employees shall be kept clear of loads about to be lifted and or suspended loads.

3.2.10 Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.

3.2.11 A sling shall not be pulled from under a load when the load is resting on the sling.

3.2.12 Slings shall not be altered in any fashion.

3.2.13 Safe operating temperatures set by the manufacturer shall be adhered to.

3.2.14 Certification tags shall remain on slings and must be kept in a legible manner.

- ❑ If the certification tag is missing, the sling shall be removed from service immediately, re-certified or replaced.

3.2.15 Rigging a Load with Rigging Equipment:

- ❑ Determine the weight of the load - Do Not Guess.
- ❑ Determine the proper size for slings and components.
- ❑ Do not use manila rope for rigging.
- ❑ Ensure that shackle pins and shouldered eyebolts are installed in accordance with the manufacturer's recommendations.
- ❑ Ensure that ordinary (i.e., shoulderless) eyebolts are threaded in at least 1.5 times the bolt diameter.
- ❑ Use safety hoist rings (i.e., swivel eyes) as a preferred substitute for eye bolts whenever possible.
- ❑ Pad sharp edges to protect slings.
- ❑ Machinery foundations or angle-iron edges may not feel sharp to the touch but could cut into rigging when under several tons of load.
- ❑ Wood, tire rubber, or other pliable materials may be suitable for padding.
- ❑ Do not use slings, eyebolts, shackles, or hooks that have been cut, welded, or brazed.
- ❑ Determine the center of gravity, and balance the load before moving it.
- ❑ Keep the attachment points of rigging accessories as far above and as far away from the center of gravity as possible.
- ❑ Initially lift the load only a few inches to test the rigging and balance.
- ❑ Protect rigging hardware as required.

- ❑ Items left in the sun may have surface temperatures that exceed the safe limits of synthetic lifting devices.

3.3 General:

3.3.1 Before use, each new, repaired, or reconditioned alloy steel chain sling, including all welded components in the sling assembly, shall be proof tested by the sling manufacturer or equivalent entity.

- ❑ The certificate of the proof test shall be filed and available for examination.

3.3.2 All rigging equipment shall be protected from physical damage caused by neglect, abuse, or misuse.

3.3.3 Rigging equipment, when not in use, shall be removed from the immediate work area so as not to present a hazard to employees.

3.3.4 All rigging equipment shall be stored and maintained in accordance with the manufacturer's recommendations.

3.3.5 Special custom design grabs, hooks, clamps, or other lifting accessories, for such units as modular panels, prefabricated structures and similar materials, shall be marked to indicate the safe working loads and shall be proof-tested (by qualified vendor), to 125 percent of their rated load, prior to use.

3.3.6 Rigging equipment shall not be loaded in excess of its recommended safe working load.

3.3.7 Job or shop hooks and links, or makeshift fasteners, formed from bolts, rods, etc., or other such attachments, shall not be used.

3.3.8 The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks.

3.3.9 Slings shall have a permanently affixed durable tag to indicate the rated capacity for different applications, hitches, angles, and/or reach.

- ❑ If the tag is missing, the sling shall be removed from service and re-certified or replaced.

3.3.10 Specific information pertaining to slings and their applications follow:

- ❑ Alloy steel chain slings:
  - ✓ Sling identification. Alloy steel chain slings shall have permanently affixed durable identification stating size, grade, rated capacity, and reach.
  - ✓ Makeshift links or fasteners formed from bolts or rods, or other such attachments, shall not be used.

- ❑ Alloy steel chain slings shall be permanently removed from service:

- ✓ If they are heated above 1000 degrees F.
- ✓ When exposed to service temperatures in excess of 600 degrees F.
- ✓ Maximum working load limits shall be reduced in accordance with the chain or sling manufacturer's recommendations.
- ✓ Slings shall be removed from service if hooks are cracked, have been opened more than 15 percent of the normal throat opening measured at the narrowest point or twisted more than 10 degrees from the plane of the unbent hook.

- ❑ Wire rope slings:

  - ✓ Sling use - wire rope slings shall not be used with loads in excess of the rated capacities.

- ❑ Minimum sling lengths:

  - ✓ Cable laid and 6x19 and 6x37 slings shall have a minimum clear length of wire rope 10 times the component rope diameter between splices, sleeves or end fittings.
  - ✓ Braided slings shall have a minimum clear length of wire rope 40 times the component rope diameter between the loops or end fittings.
  - ✓ Cable laid grommets, strand laid grommets and endless slings shall have a minimum circumferential length of 96 times their body diameter.
  - ✓

- ❑ Safe operating temperatures:

  - ✓ Fiber core wire rope slings of all grades shall be permanently removed from service if they are exposed to temperatures in excess of 200 degrees F.
  - ✓ Non-fiber core wire rope slings of any grade used at temperatures above 400 degrees F or below minus 60 degrees F, recommendations of the sling manufacturer regarding use at those temperatures shall be followed.

- ❑ Wire rope slings shall be immediately removed from service if any of the following conditions are present:

  - ✓ Ten randomly distributed broken wires in one rope lay, or five broken wires in one strand in one rope lay.
  - ✓ Wear or scraping of one-third the original diameter of outside individual wires.
  - ✓ Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure.

- ❑ Evidence of heat damage:

  - ✓ End attachments that are cracked, deformed or worn.
  - ✓ Hooks that have been opened more than 15 percent of the normal throat opening measured at the narrowest point or twisted more than 10 degrees from the plane of the unbent hook.

- ✓ Corrosion of the rope or end attachments.

- ❑ Metal mesh slings:

  - ✓ Each metal mesh sling shall have permanently affixed to it a durable marking that states the rated capacity for vertical basket hitch and choker hitch loadings.
  - ✓ All new and repaired metal mesh slings, including handles, shall not be used unless proof tested by the manufacturer or equivalent entity at a minimum of 1.5 times their rated capacity.
  - ✓ Metal mesh slings shall not be used to lift loads in excess of their rated capacities.
  - ✓ Safe operating temperatures - metal mesh slings, which are not impregnated with elastomers, may be used in a temperature range from minus 20 degrees F to plus 550 degrees F without decreasing the working load limit.
  - ✓ Metal mesh slings impregnated with polyvinyl chloride or neoprene may be used only in a temperature range from zero degrees to plus 200 degrees F.
  - ✓ For operations outside these temperature ranges or for metal mesh slings impregnated with other materials, the sling manufacturer's recommendations shall be followed.

- ❑ Repairs:

  - ✓ Metal mesh slings that are repaired shall not be used unless repaired by a metal mesh sling manufacturer or an equivalent entity.
  - ✓ Once repaired, each sling shall be permanently marked or tagged, or a written record maintained, to indicate the date and nature of the repairs and the person or organization that performed the repairs.
  - ✓ Records of repairs shall be made available for examination.

- ❑ Metal mesh slings shall be immediately removed from service if any of the following conditions are present:

  - ✓ A broken weld or broken brazed joint along the sling edge.
  - ✓ Reduction in wire diameter of 25 per cent due to abrasion or 15 per cent due to corrosion.
  - ✓ Lack of flexibility due to distortion of the fabric.
  - ✓ Distortion of the female handle so that the depth of the slot is increased more than 10 per cent.
  - ✓ Distortion of either handle so that the width of the eye is decreased more than 10 per cent.
  - ✓ A 15 percent reduction of the original cross sectional area of metal at any point around the handle eye.
  - ✓ Distortion of either handle out of its plane.
  - ✓ Natural and synthetic fiber rope slings
  - ✓ Fiber rope slings made from conventional three-strand construction fiber rope shall not be used with loads in excess of their rated capacities.

- ✓ Safe operating temperatures - natural and synthetic fiber rope slings, except for wet frozen slings, may be used in a temperature range from minus 20 degrees F to plus 180 degrees F without decreasing the working load limit.
- ✓ For operations outside this temperature range and for wet frozen slings, the sling manufacturer's recommendations shall be followed.

- ❑ Spliced fiber rope slings shall not be used unless they have been spliced in accordance with the following minimum requirements and in accordance with any additional recommendations of the manufacturer:

  - ✓ In manila rope, eye splices shall consist of at least three full tucks, and short splices shall consist of at least six full tucks, three on each side of the splice center line.
  - ✓ In synthetic fiber rope, eye splices shall consist of at least four full tucks, and short splices shall consist of at least eight full tucks, four on each side of the center line.
  - ✓ Strand end tails shall not be trimmed flush with the surface of the rope immediately adjacent to the full tucks.
  - ✓ This applies to all types of fiber rope and both eye and short splices.
  - ✓ For fiber rope less than one inch in diameter, the tail shall project at least six rope diameters beyond the last full tuck.
  - ✓ For fiber rope one inch in diameter and larger, the tail shall project at least six inches beyond the last full tuck.
  - ✓ Where a projecting tail interferes with the use of the sling, the tail shall be tapered and spliced into the body of the rope using at least two additional tucks (which will require a tail length of approximately six rope diameters beyond the last full tuck).
  - ✓ Fiber rope slings shall have a minimum clear length of rope between eye splices equal to 10 times the rope diameter.
  - ✓ Knots shall not be used in lieu of splices.
  - ✓ Clamps not designed specifically for fiber ropes shall not be used for splicing.
  - ✓ For all eye splices, the eye shall be of such size to provide an included angle of not greater than 60 degrees at the splice when the eye is placed over the load or support.
  - ✓ End attachments. Fiber rope slings shall not be used if end attachments in contact with the rope have sharp edges or projections.

- ❑ Removal from service. Natural and synthetic fiber rope slings shall be immediately removed from service if any of the following conditions are present:

  - ✓ Abnormal wear.
  - ✓ Powdered fiber between strands.
  - ✓ Broken or cut fibers.
  - ✓ Variations in the size or roundness of strands.
  - ✓ Discoloration or rotting.

- ✓ Distortion of hardware in the sling.
- ✓ Repairs - only fiber rope slings made from new rope shall be used.
- ✓ Use of repaired or reconditioned fiber rope slings is prohibited.

- ❑ Synthetic web slings:

  - ✓ Each sling shall be marked or coded to show the rated capacities for each type of hitch and type of synthetic web material.
  - ✓ Synthetic webbing shall be of uniform thickness and width and selvage edges shall not be split from the webbing's width.

- ❑ Fittings shall be:

  - ✓ Of a minimum breaking strength equal to that of the sling
  - ✓ Free of all sharp edges that could in any way damage the webbing.
  - ✓ Attachment of end fittings to webbing and formation of eyes.
  - ✓ Stitching shall be the only method used to attach end fittings to webbing and to form eyes.
  - ✓ The thread shall be in an even pattern and contain a sufficient number of stitches to develop the full breaking strength of the sling.
  - ✓ Synthetic web slings shall not be used with loads in excess of the rated capacities.

- ❑ When synthetic web slings are used, the following precautions shall be taken:

  - ✓ Nylon web slings shall not be used where fumes, vapors, sprays, mists or liquids of acids or phenolics are present.
  - ✓ Polyester and polypropylene web slings shall not be used where fumes, vapors, sprays, mists or liquids of caustics are present.
  - ✓ Web slings with aluminum fittings shall not be used where fumes, vapors, sprays, mists or liquids of caustics are present.
  - ✓ Synthetic web slings of polyester and nylon shall not be used at temperatures in excess of 180 degrees F.
  - ✓ Polypropylene web slings shall not be used at temperatures in excess of 200 degrees F.
  - ✓ Synthetic web slings that are repaired shall not be used unless repaired by a sling manufacturer or an equivalent entity.
  - ✓ Each repaired sling shall be proof tested by the manufacturer or equivalent entity to twice the rated capacity prior to its return to service.
  - ✓ The employer shall retain a certificate of the proof test and make it available for examination.
  - ✓ Slings, including webbing and fittings, which have been repaired in a temporary manner shall not be used.

- ❑ Removal from service - synthetic web slings shall be immediately removed from service if any of the following conditions are present:

  - ✓ Acid or caustic burns
  - ✓ Melting or charring of any part of the sling surface

- ✓ Snags, punctures, tears or cuts
- ✓ Broken or worn stitches
- ✓ Distortion of fittings.

3.3.11 Training:

- ❑ Training shall include:

  - ✓ Documentation of name of employee, date of training and training subject.
  - ✓ Principals of safely rigging and lifting a load.
  - ✓ Employees engaged in work on the Outer Continental Shelf (OCS) are required by Minerals Management Service (MMS) to become certified as a "rigger" through a course meeting the guidelines set forth by American Petroleum Institute's Recommended Practice (API RP 2-D) Fourth Edition.

4 References:

4.1 29 CFR 1910.184 Slings.

4.2 29 CFR 1926.251 Rigging Equipment for Material Handling.

4.3 API RP-2D Fourth Edition, "Rigger Training".

4.4 American Society of Testing and Materials Specification A391-65 (paragraph 5.2).

5 Exhibits:

S-6.1 Sling Inspection Procedures

S-6.2 Checklist For Alloy Steel Chain Slings

S-6.3 Checklist For Wire Rope Slings

S-6.4 Checklist For Metal Mesh Slings

S-6.5 Checklist For Synthetic Web Slings

Exhibit S-6.1

Sling Inspection Procedures:

Inspections of slings are categorized as either "frequent" or "annual" based upon the time interval at which inspection must occur. Documentation of an annual inspection is required for all slings. The four types of slings are alloy steel chain, wire rope, metal mesh, and synthetic web. Individual annual inspection documentation is required for alloy steel chain slings. Individual inspection documentation is not required for wire rope, metal mesh, and synthetic web slings. A written annual inspection report for each of the three sling types shall be made to reflect that each class of sling has been inspected. The criteria for inspecting these four types of slings for rigging and lifting loads are detailed below.

Frequent Inspection - All Slings:

(1) Frequent inspections – daily: the sling and all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the employer, each day before sling usage. Additionally, inspections shall be performed during the sling use, where service conditions warrant. Damaged or defective slings shall be immediately removed from service.
   - ❑ Daily inspections need not be documented.

Alloy Steel Chain Slings:

The inspection requirements for alloy steel chain slings are as listed:

(1) Sling identification - The sling must have permanently affixed durable identification which will state size, grade, rated capacity, and reach.
(2) The attachments (hooks, rings, oblong links, pear-shaped links, welded or mechanically coupled links, etc.) shall have a rated capacity at least equal to the alloy steel chain.
(3) Make-shift links or fasteners formed from bolts or rods shall not be used.
(4) In addition to the visual inspection required each day of use, a thorough inspection shall be made by a competent person at least annually.
(5) Proof testing - Before use of any new, repaired, or reconditioned alloy steel chain sling, the sling shall be proof tested by the manufacturer or equivalent entity (in accordance with ASTM specification A391-65 [ANSI G61.1]). A certificate of proof testing shall be kept and made available for examination.
(6) Sling use - Alloy steel chain slings shall not be used with loads in excess of the rated capacities.
(7) Safe operating temperatures - Alloy steel chain slings shall be permanently removed from service if they are heated above 1,000 degrees F. When exposed to service temperature above 600 degrees F, maximum load limits shall be reduced in accordance with the chain or sling manufacturer's recommendations.

Annual Inspection - Alloy Steel Chain Slings:

(1) Annual inspection - at least once every 12 months: A thorough examination must be performed by a competent person and documented.
(2) The checklist shown on the next page may be used for annual inspections of alloy steel chain slings. A vendor’s form may be substituted.

EXHIBIT S-6.2

Checklist For Alloy Steel Chain Slings *Annual Inspection*

Location: _____ **Sling I.D.:** _____

		Satisfactory? Circle: Yes	No	N/A
1.	Wear, nicks, or cracks.	**Yes**	**No**	**N/A**
2.	Defective welds.	**Yes**	**No**	**N/A**
3.	Deformation and increase in length.	**Yes**	**No**	**N/A**
4.	Discoloration from excessive temperature.	**Yes**	**No**	**N/A**
5.	Make-shift links or fasteners formed from bolts or rods	**Yes**	**No**	**N/A**
6.	Throat opening on hooks show evidence or more than 15% in excess of normal throat opening or more than 10 degrees twist from the plane of the unbent hook.	**Yes**	**No**	**N/A**

NOTE: Where defects or deterioration described above are present, the sling shall be immediately removed from service.

Comments/Corrective Actions _____

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_____ _____

Inspected By: Date:

Number of Slings Inspected: _____ Slings Removed From Service: _____

Wire Rope Slings:

The requirements for wire rope slings are described below:

(1) Wire rope slings shall not be used with loads in excess of the rated capacities.

(2) Minimum sling lengths:

- ❑ Cable laid and 6x19 and 6x37 slings shall have a minimum clear length of wire rope 10 times the component rope diameter between splices, sleeves, or end fittings.
- ❑ Braided slings shall have a minimum clear length of wire rope 40 times the component rope diameter between the loops or end fittings.
- ❑ Cable laid grommets, strand laid grommets, and endless slings shall have a minimum circumferential length of 96 times their body diameters.

(3) Fiber core wire rope shall be removed from service if exposed to temperatures in excess of 200 degrees F.

(4) Wire rope slings shall be cleaned of all dirt, grease, or other contaminates and lubricated with an approved wire rope lubricant.

(5) Wire rope clips shall not be used to fabricate wire rope slings except where application of slings prevents the use of prefabricated slings or where the specific application is designed by a qualified person.

(6) Wire rope slings are recommended to be of the type with loops formed by a Flemish eye splice and a mechanical splice. This is accomplished with a sleeve pressed on by mechanical means. This type of fabrication provides the greatest strength.

Annual Inspection - Wire Rope Slings:

(1) Annual inspection - A thorough examination must be performed, at least once every 12 months, and documented by a competent person.

(2) A record shall be made of the annual inspection stating the number of wire rope slings inspected, who conducted the inspection, the inspection date, and whether any slings were found which met the criteria for removal from service and their disposition. The criteria for removal from service is described in the checklist.

(3) The checklist shown on the next page may be used for annual inspections of wire rope slings (checklist use not required; a written report is required). A vendor's form may be substituted.

EXHIBIT S-6.3

Checklist For Wire Rope Slings

Annual Inspection

Location: _____ **Sling I.D.:** _____

		Satisfactory? Circle: Yes	No	N/A
1.	Ten randomly distributed broken wires in one rope lay, or five broken wires in one strand in one rope lay.	**Yes**	**No**	**N/A**
2.	Wear or scraping of one-third the original diameter of outside individual wires.	**Yes**	**No**	**N/A**
3.	Kinking, crushing, bird caging, or other damage resulting in distortion of the wire rope structure.	**Yes**	**No**	**N/A**
4.	Evidence of heat damage.	**Yes**	**No**	**N/A**
5.	End attachments that are cracked, deformed, or worn.	**Yes**	**No**	**N/A**
6.	Corrosion of the rope or end attachments.	**Yes**	**No**	**N/A**
7.	Throat opening on hooks show evidence or more than 15% in excess of normal throat opening or more than 10 degrees twist from the plane of the unbent hook.	**Yes**	**No**	**N/A**

NOTE: Where defects or deterioration described above are present, the sling shall be immediately removed from service.

Comments/Corrective Actions _____

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Inspected By: Date:

Number of Slings Inspected: _____ Slings Removed From Service: _____

Metal Mesh Slings:

The requirements for metal mesh slings are described below:

(1) Sling identification - Each metal sling shall have a durable marking, permanently affixed to it, that states the rated capacity for vertical basket hitch and choker hitch loadings.

(2) Handles - Handles shall have a rated capacity at least equal to the metal fabric and exhibit no deformation after proof testing.

(3) Attachment of handles to fabric. The fabric and handles shall be joined so that:

- ❑ The rated capacity of the sling is not reduced,
- ❑ The load is evenly distributed across the width of the fabric, and
- ❑ Sharp edges will not damage the fabric.

(4) Sling coatings - Coatings which diminish the rated capacity of a sling shall not be applied.

(5) Sling testing - All new and repaired metal mesh slings, including handles, shall not be used unless proof tested by the manufacturer, or equivalent entity at a minimum of 1.5 times their rated capacity. Elastomer impregnated slings shall be proof tested before coated.

(6) Proper use of metal mesh slings. Metal mesh slings shall not be used to lift loads in excess of their rated capacities.

(7) Safe operating temperatures - Metal mesh slings which are not impregnated with elastomers may be used in a temperature range from minus 20 degrees F to plus 550 degrees F without decreasing the working load limit. Metal mesh slings impregnated with elastomers may only be used in the temperature range from 0 degrees F to plus 200 degrees F.

(8) Repairs - Metal mesh slings shall be repaired only by a metal mesh sling manufacturer or equivalent entity. Once repaired, each sling shall be permanently marked or tagged; or a written record maintained indicating date of repairs, nature of repairs, and the person or organizations performing the repairs.

(9) Records of repairs shall be made available for examination.

Annual Inspection - Metal Mesh Slings:

(1) Annual inspection: A thorough examination must be performed, at least once every 12 months, and documented by a competent person.

(2) A record shall be made of the annual inspection stating the number of metal mesh slings on hand, who conducted the inspection, the inspection date, and whether any slings were found which met the criteria for removal from service and their disposition. The criteria for removal from service is described in the checklist for metal mesh sling inspection.

(3) The checklist shown on the next page may be used for annual inspections of metal mesh slings (checklist use voluntary; a written report is required). A vendor’s form may be substituted.

EXHIBIT S-6.4

Checklist For Metal Mesh Slings

Annual Inspection

Location: _____ **Sling I.D.:** _____

		Satisfactory? Circle: Yes	No	N/A
1.	A broken weld or broken brazed joint along the sling edge.	**Yes**	**No**	**N/A**
2.	Reduction in wire diameter of 25% due to abrasion or 15% due to corrosion.	**Yes**	**No**	**N/A**
3.	Lack of flexibility due to distortion of the fabric.	**Yes**	**No**	**N/A**
4.	Distortion of either handle so that the width of the eye is decreased by more than 10%.	**Yes**	**No**	**N/A**
5.	Distortion of the female handle so that the depth of the slot is increased more than 10%.	**Yes**	**No**	**N/A**
6.	A 15% reduction of the original cross-sectional area of metal at any point around the handle eye.	**Yes**	**No**	**N/A**
7.	Distortion of either handle out of its plane.	**Yes**	**No**	**N/A**

NOTE: Where defects or deterioration described above are present, the sling shall be immediately removed from service.

Comments/Corrective Actions _____

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_____ _____

Inspected By: Date:

Number of Slings Inspected: _____ Slings Removed From Service: _____

Synthetic Web Slings:

The requirements for synthetic web slings are described below:

(1) Sling identification. Each sling shall be marked or coded to show the rated capacities for each type of hitch and type of synthetic web material. If marking is illegible, the sling must be removed from service.

(2) Webbing. Synthetic webbing shall be of uniform thickness and width and salvage edges shall not be split from the webbing width.

(4) Fittings. Fittings shall be:

- ❑ Of minimum breaking strength equal to that of the sling; and
- ❑ Free of all sharp edges that could in any way damage the webbing.

(4) Attachment of end fittings to webbing and formation of eyes. Stitching shall be the only method used to attach end fittings to webbing and to form eyes. The thread shall be in an even pattern and contain sufficient numbers of stitches to develop the full breaking strength of the sling.

(5) Sling use. Synthetic web slings shall not be used with loads in excess of the rated capacities.

(5) Environmental consideration. When synthetic web slings are used, the following precautions shall be taken.

- ❑ Nylon web slings shall not be used where fumes, vapors, sprays, mists, or liquids of acids or phenolics are present.
- ❑ Polyester and polypropylene web slings shall not be used where fumes, vapors, sprays, mists, or liquids of caustics are present.
- ❑ Web slings with aluminum fittings shall not be used where fumes, vapors, sprays, mists, or liquids of caustics are present.

(7) Safe operating temperatures. Synthetic web slings of polyester and nylon shall not be used at temperatures in excess of 180 degrees F. Polypropylene web slings shall not be used at temperatures in excess of 200 degrees F.

(8) Repairs - Synthetic web slings shall be repaired only by a sling manufacturer or an equivalent entity. Once repaired, each sling shall be proof tested by the manufacturer or equivalent entity to twice the rated capacity before use. The employer shall retain a certificate of the proof test and make it available for examination. Slings, including webbing and fittings, which have been repaired in a temporary manner shall not be used.

Annual inspection - Synthetic Web Slings:

(1) Annual inspection - A thorough examination must be performed, at least once every 12 months, and documented by a competent person.

(2) A record shall be made of the annual inspection stating the number of synthetic web slings on hand, who conducted the inspection, the inspection date, and whether any slings were found which met the criteria for removal from service and their disposition. The criteria for removal from service is described in the checklist.

(3) The checklist shown on the next page may be used for annual inspections of synthetic web slings (checklist use is not required; a written report is required). A vendor's form may be substituted.

EXHIBIT S-6. 5

Checklist For Synthetic Web Slings *Annual Inspection*

Location: _____ **Sling I.D.:** _____

		Satisfactory? Circle: Yes No N/A		
1.	Acid or caustic burns.	Yes	No	N/A
2.	Melting or charring of any part of the sling surface.	Yes	No	N/A
3.	Snags, punctures, tears, or cuts.	Yes	No	N/A
4.	Broken or worn stitches.	Yes	No	N/A
5.	Distortion of fittings.	Yes	No	N/A

NOTE: Where defects or deterioration described above are present, the sling shall be immediately removed from service.

Comments/Corrective Actions _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ _____

Inspected By: Date:

Number of Slings Inspected: _____ Slings Removed From Service: _____