LOAD-HANDLING DEVICES

1. Lifting hooks (Hook assembly)

Crane hooks are classified depending on their manufacturing materials as well as the intended usage and, (amongst other factors) according to this, some aspects are more important than others. Different types of crane hooks can be classified according to their shapes, method of manufacture, mode of operation or other unique characteristics.

They are made in a variety of styles to meet specific needs and they are rated for loads of specific type and size. To understand this deeply, we will focus on the main types of crane hooks available in the market and see which applications they are most suitable for.

Before we start though, is important to remember that crane hooks or lifting hooks are necessary in order to move different and many types of loads and that there are a lot of uses depending on the application the intended use is for.

Crane hooks are available in a wide range of configurations based upon their size, their load capacity and their intended use. It should therefore come as no surprise that there are a number of crane hook types of choose from. These include:

1. Single and double hooks
2. Forging and laminated hooks
3. Closed and semi-closed hooks
4. Electric rotary hooks

This being said, when you're looking to define crane hooks depending on their shape, you will usually be able to choose between single crane and double crane hooks. As the name suggests, the main difference between these two options is the number of hooks included, and there are different sub-types possible such as

the C-hooks (which is essentially a single hook variant with a slightly different shape).

Single Crane Hooks. These type of crane hooks are the right choice if your machinery deals with loads of up to 75 tons; this lifting hook is very simple and easy to use no matter which variant you choose.

Double Crane Hooks. They are similar in conception, but their design provides superior bearing which is suitable for heavier loads of over 75 tons.

When it comes to the manufacturing methods used to create crane hooks, there are two main styles available: forging crane hooks and laminated crane hooks. Each option offers particular benefits and drawbacks that must be kept in mind while deciding which is better suited for our specific requirements.

Forging Crane Hooks. These hooks are forged from a single piece of high quality steel with low carbon which is cooled slowly to ensure optimum stress resistance (usually ranging from 16Mn to 36MnSi). These hooks typically feature very simple manufacturing and are also very simple to use, since they're made of a single piece, with installation being very straightforward.

Laminated Crane Hooks. They are a little more complex, and are comprised of several steel plates riveted together to ensure higher stress resistance and increased safety. These hooks are conceived in a way that allows the hook to keep working even if some of the individual crane hook parts are damaged. Laminated hooks are available as single hooks or double laminated hooks, and there are several models available to match different applications.

If you're concerned about having the right hook attachments, then you have to choose between closed and semi-closed crane hooks. These different types of hooks feature an attachment for added security for carrying heavy loads; as the name suggests, the attachment can be closed or semi-closed.

Closed Crane Hooks. The closed crane hooks attachments are somewhat harder to use and more time-consuming, but they offer the highest possible safety measures and load bearing potential.

Semi-Closed Crane Hooks. They aim to bridge the gap, as they offer increased security levels compared to standard lifting hooks, while being reasonably simpler to attach and dismount than closed hooks.

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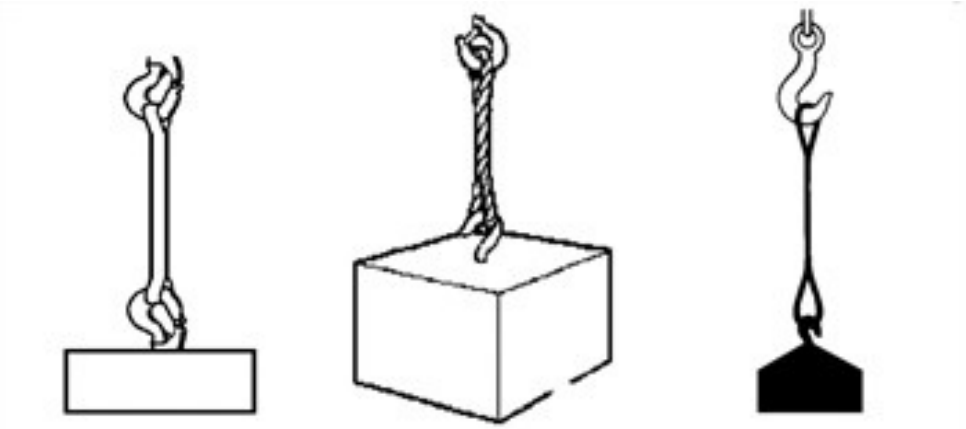
2. Sling hitches

Lifting slings are designed to be used in several types of hitches so that the best configuration can be used for handling and controlling a particular load.

Lifting slings are designed to be used in several types of hitches so that the best configuration can be used for handling and controlling a particular load. When putting a lift plan together, best practice is to always determine the best type of lifting sling and the type hitch you're going to use prior to rigging the load.

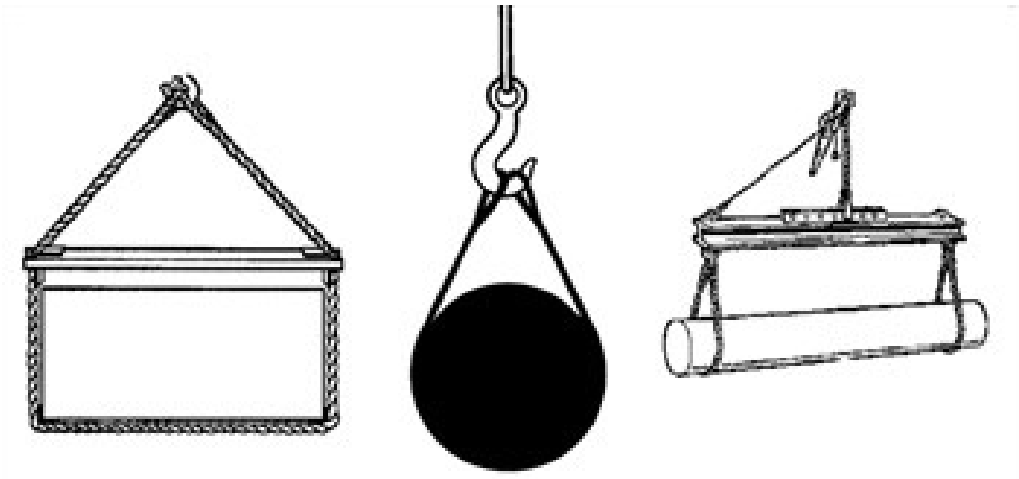
A vertical hitch, or straight hitch, is the most basic hitch used to directly connect a load to a lifting device. On a vertical hitch, the eye of a single chain sling, wire rope sling, or synthetic sling is connected to the crane or hoist hook, while the other eye is connected to an attachment point on the load.



Vertical Hitch

A lift made using a **vertical hitch** will utilize the full lifting capacity of the sling. However, when performing a lift with just a single sling, a tagline should be used to provide additional load control and minimize rotation or twisting while an overhead lift is being performed.

Basket hitches distribute a load equally between the two legs of a sling. When using a basket hitch, the load is cradled by running the sling underneath the load and then attaching both eyes of the sling separately to the hook.



Basket Hitch

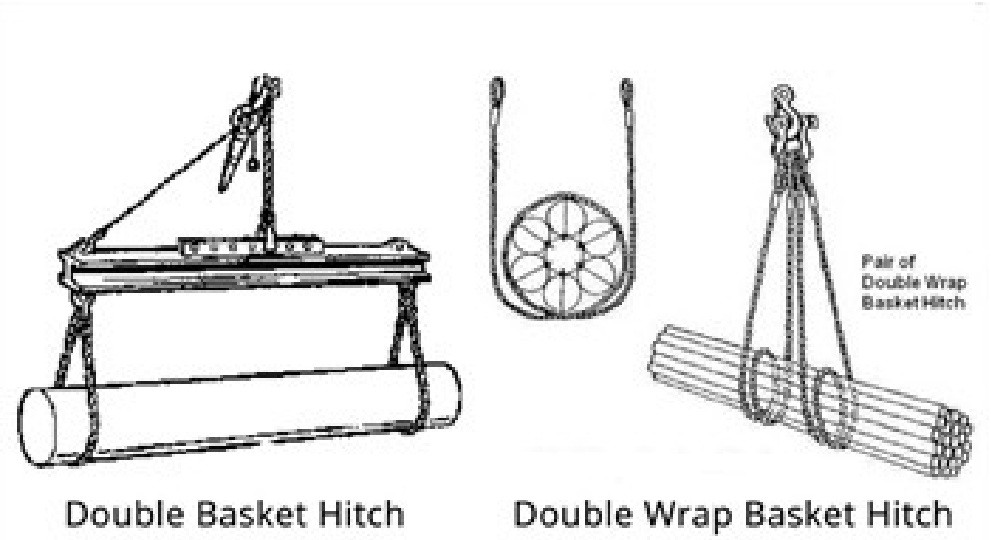
A basket hitch has twice the lifting capacity of a single leg vertical hitch when the legs are in a true 90° vertical fashion and the D/d ratio is 25:1. This

typically requires a below-the-hook lifting device like a lifting beam or a spreader bar, or two separate lifting devices.

If the sling angle is less than 90° when using a basket hitch, the sling capacity is reduced. Basket hitches should not be used on unbalanced loads or loads that are difficult to balance. More than one sling may be necessary to help ensure load control. Don't use basket hitches with loads that are difficult to balance.

Horizontal Capacity % of Angle Single Leg	
90°	200%
60°	170%
45°	140%
30°	100%

Basket hitches can be used as either a single, double, or double-wrap configuration:



Double Basket Hitch Double Wrap Basket Hitch

Double Basket Hitch – uses two slings to balance a load by keeping the slings apart.

Double Wrap Basket Hitch – Similar to a standard basket hitch, except the sling is wrapped around the load twice. This provides excellent load control for loose materials and good grip on smooth surfaces.

When using a double wrap on a basket hitch, do not overlap the length of the sling at the bottom of the load and keep your eye on the positioning of the sling as slack is taken up.

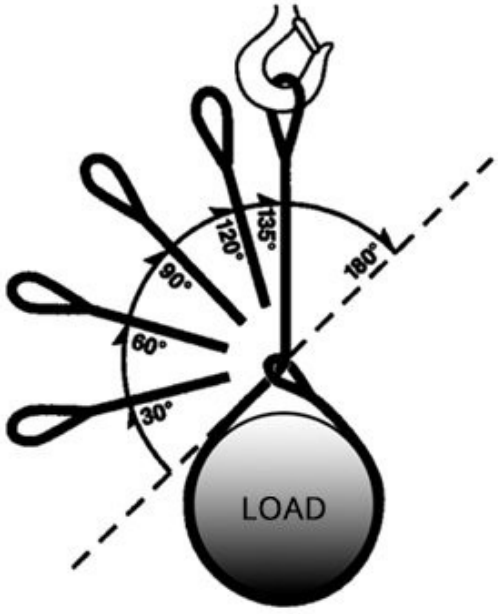
Choker Hitch

A choker hitch is used to tighten or snug a sling down securely to provide greater load control. When using a choker hitch, one eye of the hitch is wrapped around the load and then passed through itself and then attached to the crane or hoist hook.

Due to stresses created at the choke point, a choker hitch reduces the lifting capacity to 75-80% of what it is capable at in a single leg vertical hitch. The least amount of capacity reduction occurs when the angle of choke is 120° or greater. Any less than 120° angle of choke can result in a lifting capacity as low as 40% of the single leg.

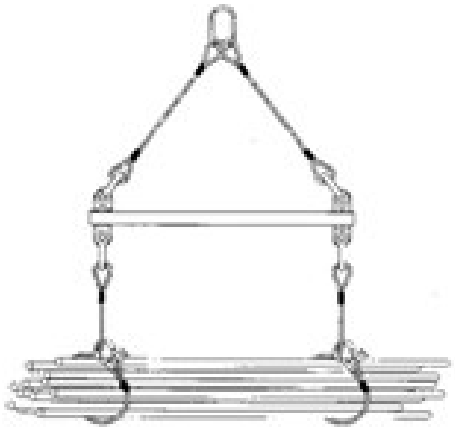
Angle of Choker Hitch (Degrees)		Rated Capacity Percent*
Equal to or Greater Than	Less Than	
120°	180°	100%
90°	120°	87%
60°	89°	74%
30°	59°	62%
0°	29°	49%

*Percent of a sling's rated capacity in choker hitch.

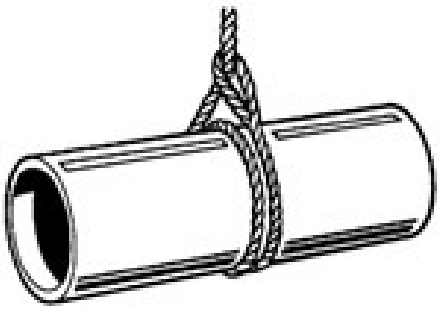


Choker Hitch Capacity

Choker hitches should not be used on unbalanced loads or loose bundles because the sling will never make full 360° contact with the load. For more complete contact, use a double wrap choker hitch (see below).



Double Choker Hitch



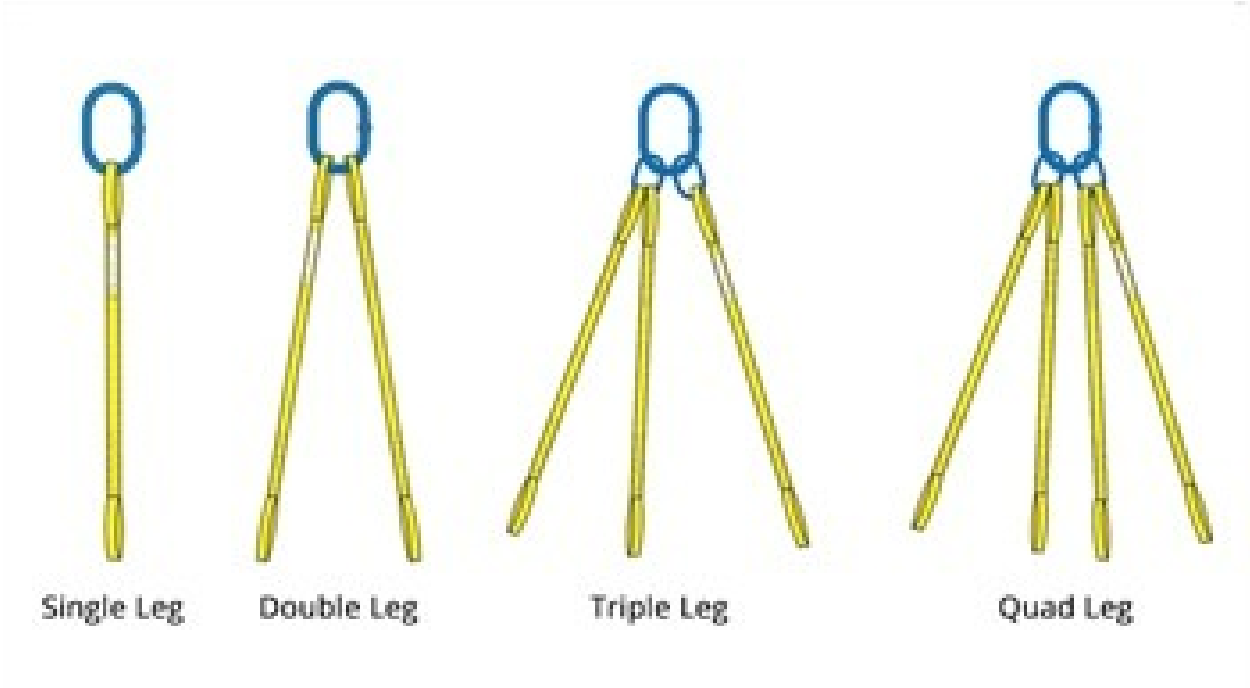
Double Wrap Choker Hitch

Double Choker Hitch – uses two slings in a choker hitch to provide more contact area to secure a load.

Double Wrap Choker Hitch – similar to standard choker hitch, except that the sling is wrapped around the load twice. This hitch compresses the load and can help prevent it from slipping out of the sling.

Make sure that you use slings that are long enough so that the choker hitch is effective and grips the load. The choke point should always be on the sling body and never on the sling eye, a fitting, base of the eye or fitting, or on a splice or tag. The choke hitch should always be pulled tight before the lift is made—not pulled down during the lift.

Bridle (Multiple Leg) Sling Assemblies



There is another type of rigging method that involves multi-leg bridle sling assemblies made with two, three, or four straight legs attached to a master link. Bridle sling assemblies can be used for lifting and handling loads that have fixed lifting lugs or attachment points.

The multiple legs of the sling attach to a master link and work together to provide additional support and stability when the slihg hook is positioned over the center of gravity of the load. Bridle sling assemblies can have adjustable sling leg lengths to help level and control unbalanced loads. Always make sure you check each sling angle and refer to a rigging chart to make sure the sling is not overloaded based on the working sling angle.

Single Leg Sling Assemblies: When 90° to horizontal (a vertical hitch), the capacity is 100% of the vertical hitch rating on the tag.

Double Leg Sling Assemblies: In this configuration, both legs share the load equally IF:

Sling leg lengths are equal

Pick is directly over the center of gravity

Center of gravity is in center or middle of load being lifted

Triple Leg Sling Assemblies: This configuration offers increased lifting capacities over double leg sling assemblies of equal quality and size.

Quad Leg Sling Assemblies: This configuration offers improved stability but provides increased capacity only if all legs share an equal share of the load.

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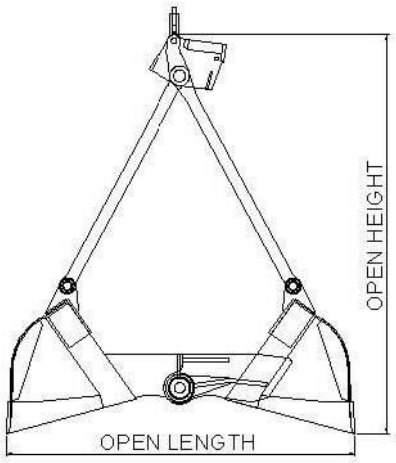
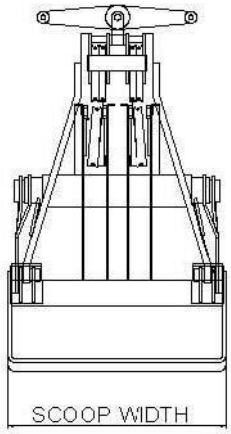
3. Mechanical Two Rope Clamshell Grabs

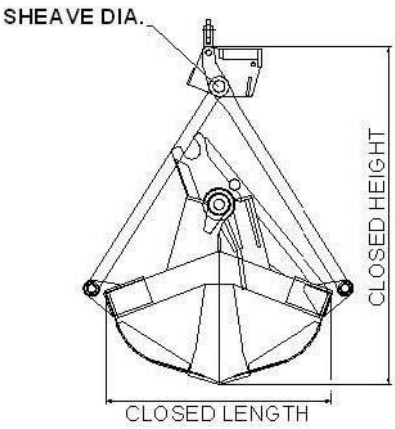
The Two Rope Mechanical Clamshell grabs for two line operated cranes (One Holding Rope and One closing Rope). The grabs are specially designed for charging and discharging sand, gravel and other bulk materials. The grabs can be executed with open or closed shells depending on the job and the type of material to be handled. The grabs are manufactured of high wear resistant steels. All bearings are heavy duty and sealed for high performance.

Optional the Grabs shells can be executed with Kick plates to reduce capacity. This will give you an advantage when bulk materials with various densities are (dis)charged. This can be calculated to the biggest capacities possible in combination with the lifting capacity of your crane.

Closed shells are to minimize dust clouds when the content of the load is powder. In many countries closed shells are mandatory to avoid pollution. The dust vents on top of the shells prevent a vacuum.







TWO LINE LEVER ARM BUCKETS

NORMAL WIDTH REHANDLING BUCKETS

Capacity Cu. Yds.	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3
Net Weight Lbs.	1500	1600	2300	2400	2900	3130	3540	4200	4775	5500	6000	6250	7820
Width	29"	32"	35"	36"	37"	39"	41"	46"	52"	54"	56"	58"	62"
Open Length	65"	68"	73"	78"	81"	85"	90"	95"	106"	110"	115"	119"	127"
Closed Length	51"	54"	56"	63"	64"	67"	71"	74"	73"	76"	79"	81"	87"
Open Height	80"	83"	89"	94"	100"	106"	110"	112"	113"	120"	123"	127"	136"
Closed Height	69"	71"	77"	80"	87"	92"	95"	95"	101"	108"	111"	114"	122"
Sheave Diameter	10.375"	10.375"	11.375"	11.375"	13"	14.5"	14.5"	16"	16"	18"	18"	18"	19.5"
Rope Size	0.5"	0.5"	0.625"	0.625"	0.75"	0.75"	0.75"	0.75"	0.75"	0.875"	0.875"	0.875"	1"

WIDE REHANDLING BUCKETS

Capacity Cu. Yds.	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3	3 1/2	4 1/4	5	6	7
Net Weight Lbs.	2150	2560	3270	3520	4470	4650	5350	5970	6580	7720	8800	10,500	11,750	14,770	16,750
Width	3' 6"	3' 9"	4' 3"	4' 7"	4' 11"	5' 3"	5' 6"	5' 9"	6' 0"	6' 5"	6' 8"	7' 2"	7' 5"	7' 9"	8' 2"
Open Length	6' 7"	6' 11"	7' 5"	7' 8"	8' 3"	8' 6"	8' 9"	9' 2"	9' 3"	9' 9"	10' 7"	11' 2"	11' 8"	12' 7"	13 2"
Closed Length	4' 9"	5' 1"	5' 5"	5' 8"	6' 0"	6' 3"	6' 7"	6' 10"	7' 2"	7' 6"	7' 11"	8' 6"	9' 1"	9' 8"	10' 5"
Open Height	7' 2"	7' 9"	8' 3"	8' 7"	9' 3"	9' 6"	10' 4"	10' 4"	10' 8"	11' 4"	11' 10"	12' 5"	13' 4"	14' 3"	14' 11"
Closed Height	6' 3"	6' 9"	7' 2"	7' 5"	8' 0"	8' 2"	8' 8"	8' 11"	9' 1"	9' 8"	10' 2"	10' 6"	11' 3"	12' 2"	12' 7"
Sheave Diameter	11.375"	13	14.5"	14.5"	16"	16"	18"	18"	18"	19.5"	19.5"	19.5"	22.5"	24	24
Rope Size	0.5"	0.625"	0.75"	0.75"	0.75"	0.75"	0.875"	0.875"	0.875"	1"	1"	1"	1.125"	1.25"	1.25"

GENERAL PURPOSE BUCKETS

Capacity Cu. Yds.	3/8	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	3 1/2	4
Net Weight Lbs.	1130	1600	2320	2550	3040	3850	4150	4860	5560	6700	8340	8,950	10,990	12,200
Width	2' 4"	2' 4"	2' 7"	2' 7"	3' 2"	3' 2"	3' 5"	3' 8"	3' 10"	4' 0"	4' 4"	5' 3"	5' 10"	6' 2"
Open Length	5' 2"	5' 6"	6' 0"	6' 7"	6' 8"	7' 3"	7' 8"	8' 1"	8' 7"	8' 11"	9' 11"	10' 8"	11' 0"	10' 0"
Closed Length	4' 8"	4' 10"	5' 3"	6' 0"	6' 0"	6' 9"	7' 2"	7' 5"	7' 11"	8' 4"	9' 0"	9' 3"	9' 7"	10' 5"
Open Height	6' 10"	7' 2"	7' 10"	8' 5"	8' 9"	9' 10"	10' 2"	10' 11"	11' 5"	12' 1"	13' 1"	11' 4"	11' 6"	12' 11"
Closed Height	5' 5"	5' 10"	6' 4"	6' 8"	7' 1"	7' 9"	8' 0"	8' 8"	9' 1"	9' 7"	10' 5"	10' 2"	10' 4"	10' 8"
Sheave Diameter	10.375	10.375	11.375	11.375	13	14.5	14.5	16	16	18	19.5	19.5	19.5	21
Rope Size	0.5"	0.5"	0.625"	0.625"	0.75"	0.75"	0.75"	0.75"	0.75"	0.875"	1"	1"	1"	1"

HARD DIGGING BUCKETS

Capacity Cu. Yds.	3/8	3/8 Nar	1/2	1/2 Nar	3/4	3/4 Nar	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	4
Net Weight Lbs.	1755	1760	2515	2465	3460	3115	4250	5020	5500	6850	7000	9,140	10,375	13,990
Width	2' 4"	2' 0"	2' 8"	2' 4"	3' 2"	2' 8"	3' 2"	3' 6"	3' 9"	3' 11"	4' 1"	4' 5"	4' 8"	5' 1"
Open Length	5' 7"	6' 0"	6' 1"	6' 4"	6' 7"	7' 1"	7' 4"	7' 9"	8' 2"	8' 8"	8' 11"	9' 8"	10' 3"	11' 1"
Closed Length	4' 11"	5' 3"	5' 5"	5' 8"	6' 1"	6' 6"	6' 10"	7' 1"	7' 7"	8' 0"	8' 4"	9' 0"	9' 7"	10' 9"
Open Height	7' 3"	7' 7"	7' 11"	8' 2"	8' 10"	9' 2"	9' 10"	10' 6"	11' 0"	11' 9"	12' 1"	13' 2"	13' 9"	15' 0"
Closed Height	5' 10"	6' 1"	6' 5"	6' 6"	7' 1"	7' 3"	7' 10"	8' 5"	8' 9"	9' 5"	9' 7"	10' 5"	10' 10"	11' 8"
Sheave Diameter	10.375	10.375	11.375	11.375	13	13	14.5	16	16	18	18	19.5	19.5	21
Rope Size	0.5"	0.5'	0.625"	0.625"	0.75"	0.75"	0.75"	0.75"	0.75"	0.875"	0.875"	1"	1"	1.125"

Go to the outline