

# PRIMARY ARBORIST PRODUCT CATEGORIES | DEFINITIONS AND DESCRIPTIONS

There is a very large offering of unique products that make up the arbor care industry. Multiple categories of products with specific support functions all rolled into a complex system to enable remarkable work techniques that assist the arborist care, utility industries, rescue systems and in some cases recreational climbing. These products have unique uses and names associated with them.

The following is a “Cliff Notes” version of a brief description of some of the most important arborist category components that are necessary to support the arbor care industry. There are many other items in this category but this brief guide is intended to cover the primary categories. This information is designed to be helpful to the sales professionals that are just getting started in the arbor care industry.

Additionally, after having reviewed this document, you are encouraged to look at samples of these different items on the internet and enjoy you tube videos of how each component is used.

## SADDLES



**Saddles:** Saddles are “step into” heavy duty harness type products worn by arborist that fit around the waist, back and legs. They are constructed of leather, nylon and rubber and sewn in steel or aluminum rings that are attachment points for safety lines and “flip lines”. (See Flip lines and lanyards). A saddle is the primary component that a worker puts on before climbing a tree, utility pole or ascending a utility tower. Saddles offer maximum leg, back and body support when vertically suspended. Saddles have multiple attach points to secure the climber to safety lines, attachment of lanyards or “flip lines”, chainsaw lanyards and tool hooks for accessories. The primary attachment ring for a saddle is the ventral (belly button) ring positioned at the abdomen. There are also two side attachment points with rings typically used for fastening climbing lanyards and/or flip lines. Saddles typically come in 4 sizes. Small, medium, large and extra large. The most popular sizes for arborist are small and medium.



Saddles are often offered in multiple categories from the same manufacturer based on expense and user preference. All are designed for and adequate for vertical safety. The same manufacturers typically make multiple categories and models of saddles. There are basic light weight entry level saddles, medium range products which feature more material and amenities and the premiere category for maximum support, features and benefits.

Popular brands of saddles include Buckingham (Buck), Weaver, Edelrid, Camp and Elk River Inc.

## HARNESSES



**Harnesses:** Harnesses are similar to saddles but can range from very light weight strap versions providing additional fall protection and exceptional mobility and movement to heavier versions similar to saddles. The job requirement or recreational endeavor dictates the variation of a harness one might use. Typically, harnesses would not offer the same level of back and seat support that a saddle would although some premium harnesses operate in a similar manner as a saddle. Harnesses can have a ventral and/or an upper center chest connection point. They fit around the chest, waist and legs. Harnesses are popular for rescue operations, recreational rock climbing, safety in utility bucket trucks as well as arborist applications. Advantages of a harness are the freedom of movement, lighter weight and versatility.

## ROPES

Arborist ropes are typically described in two categories. **Climbing Ropes and Rigging Ropes.** The term “bull rope” is another industry description for a rigging rope. Ropes are manufactured using different types of material for the outer coverings over different materials used to construct the center “core” of a rope.

### Climbing Ropes



**Climbing ropes** are specifically manufactured using materials and characteristics best suited for climbing and the use of mechanical ascending and descending devices for vertical height work. The five characteristics that are very important to the user of climbing ropes are length, diameter, construction, cover and core. Materials used for the construction of climbing ropes reduce the occurrence of “bunching” or rope distortion that would impede the progress of a climber.

Climbing Ropes can be 12, 16 or 24 strand construction and can be 7/16's, 1/2 inch, 9/16's or 5/8's in diameter. Popular lengths of climbing ropes are 120, 150 and 200 foot hanks. Some climbing ropes have a spliced eye or are manufactured with a loop on the end while other ropes are non “spliceable”.

The current ANSI standard states that Arborist climbing lines shall have a minimum diameter of 1/2 inch and a minimum breaking strength of 5,400 pounds. 7/16's diameter ropes may be used provided the employer can demonstrate it does not create a safety hazard for the arborist and the arborist has been instructed in its use.

Climbing ropes are used by arborist/workman for safety lines, ascending into a tree or descending down from the tree depending upon the climbing style the user prefers.

Tensile strength describes a rope's breaking point. Typically climbing ropes for vertical elevation in the arborist and utility industries have a tensile strength of anywhere from 4,000 to 7,000 lbs.

### Rigging (Bull) Ropes



A **rigging rope** (or bull rope) is used to “rig” or attach to a limb or tree trunk at a significant height that is to be cut and removed under a controlled environment. Rigging ropes allow the arborist(s) to lower a heavy limb or tree trunk to the ground without having it free fall and damage landscaping, pools ,fences, cars or property on the ground. “Limbing” is a term that often describes a situation that requires a controlled lowering of tree limbs or tree trunks.

One end of the rigging rope is typically anchored to another nearby tree base or immovable object and the other end of the rigging rope is pulled up into the tree that is being trimmed or removed and secured to the next section above the limb that is to be cut away. A rigging line would be positioned or draped over a second limb higher than the targeted limb that is to be removed. The climber attaches the rigging rope to the targeted limb. Once cut, assistants on the ground, using the rigging rope, can lower the cut section to the ground under controlled circumstances and speed.

Rigging or bull ropes are very strong for obvious reasons. Tensile strength of rigging ropes for the arborist category typically range from 12,000 to 45,000 pounds. Popular rigging rope diameters are 1/2”, 9/16's, 5/8's, 3/4 “, 7/8's” and 1 inch. Popular length of rigging ropes are 150 and 200 ft. lengths.

Rigging Rope construction is typically 3 strand, double braid or 12 strand. Double braid and 12 strand are more popular and 3 strand rigging rope is less expensive.



# ROPE NOTES

Characteristics of ropes include, length, diameter, material construction, stretch, tensile strength, flexibility, maintaining shape, cover over core slippage and the number of strands a rope has. The number of strands a rope is made from, the outer material, diameter, tensile strength, color and length are perhaps the six most sought after features. Some ropes have a spliced eye, or are manufactured with a loop on the end while other ropes are non “spliceable”

The ANSI standard states that Arborist climbing lines shall have a minimum diameter of ½ inch and a minimum breaking strength of 5,400 pounds. Some lines of 7/16’s diameter may be used provided the employer can demonstrate it does not create a safety hazard for the arborist and the arborist has been instructed in its use.

The color of any rope being used in vertical height operations is very important because of safety. Climbers and vertical workers like to use the same color ropes for climbing, the same color rope for their safety lines and the same color rope for rigging. Familiarity of which color rope does what is critically important as the workers constantly reach for, hook and unhook themselves from different lines while working in a vertical environment. The color of ropes is very important to virtually every climber. A hearty inventory of multiple colors of ropes promotes greater sales.

Major manufacturers of arborist ropes (cordage) are Pelican Rope, Samson, Yale Cordage, Teufelberger, New England Cordage and All Gear. Name brand ropes are very important to the end user.

## ROPE BAGS



**Rope Bags:** A variety of bags in various sizes and materials are available for storing and transporting ropes and additional arborist gear. Storage bags for ropes is very important for arborist. Because of safety and the very serious nature of elevated vertical work, ropes are kept in pristine condition and out of the sunlight and rain. Rope deterioration can occur from ultraviolet rays as well as dampness.

There are smaller bags specifically designed just for rope storage and larger and extra-large bags for storage of ropes and other arborist supplies. Rope and gear bags are very popular.

There are multiple popular brands of rope and gear bags.

## SLINGS



**Slings and Whoopie Slings:** Slings are sections of heavy rigging grade rope in lengths of 8 to 15 feet that are used to secure a “Port-A-Wrap” (see Port-A-Wrap) to the base of a tree for the purpose of controlling the lowering of heavy limbs or sections of tree trunks. A sling is a major component of the rigging process.

Slings are typically rope sections made of 1”2”, 9/16’s, 5/8’s or ¾” rope. They can have a sewn in manufactured loop on one end or both ends of the rope section that helps secure and tie off the Port-A-Wrap to the tree or another suitable anchor point.

A “Whoopie” sling is a section of rope with a loop at one end that feeds back into a mutual sleeve and comes back out the other side. Whoopie slings are sometimes preferred over regular slings because of the ease of adjustment.

It is recommended to watch videos of how slings work and how they attach Port-A-Wraps to tree trunks.

## PORT-A-WRAP



**Port-A-Wrap:** A Port-A-Wrap is an oddly shaped steel or aluminum device that is used to restrict the flow of rope in order to lower heavy limbs or sections of tree trunk in a slow controlled environment. Port-a-wraps come in different sizes, small (mini), medium, large and xtra-large. The base shape of a large size port-a-wrap is a central cylinder approximately 12" to 14" long about the diameter of a large soup can. There are twin steel or aluminum post approximately 3" in length on one end of the device and different sized loops welded to the port-a-wrap on the opposite end along with another small post referred to as the "pipe". The loops are for using a sling to secure the port-a-wrap then wrapping the sling around the tree trunk and securing the other end of the sling to the Port-A-Wrap. It is best to secure the Port-A-Wrap low on the tree trunk for leverage when tying off the sling. (See Slings and Whoopie Slings).

Entering on the loop and pipe end of the device, A rigging rope is then fed around the cylinder of the port-a-wrap multiple times and around the twin post on the end of the device while the other end of the rigging rope is taken or pulled up into the canopy of the tree and secured to the object, limb or trunk section that is to be lowered. The manner in which the rope is threaded around the port-a-wrap and then "hitched" to the twin post restricts the heavy object from being able to fall freely. One person can lower extremely heavy limbs or trunk sections by themselves as the design of the port-a-wrap makes it difficult for the rope to unravel back through the device.

Port-A-Wraps can be made from steel, stainless steel or aluminum and are offered in nickel, flat black, pewter and chrome finishes. There are several manufacturers of Port-A-Wraps.

## CLIMBERS



**Climbers:** Climbers are the family of products that have steel, aluminum or titanium spikes (gafts) that an arborist or utility pole worker would fasten to their lower legs and ankles that would enable the worker to dig the spikes into a tree or utility pole and ascend upwards to their desired height using the strength of their legs. Climbers are typically solid steel or aluminum frames with stirrups that go under the work boot and up the side of the workers leg into padding and are strapped on to hold their weight as they climb. The gafts (spikes) are mounted inward facing the pole or tree. Climbers are used in conjunction with a "flip line" or "lanyard" that goes around the tree or pole and is fastened to the side rings of the climber's saddle. The climber then "flips" the lanyard or flip line upwards on the tree trunk and uses their climbers to walk up to the level of the lanyard and repeats the process to their desired height.

Climbers consist of the leather guards for the legs, climbing spikes, stirrups, straps and buckles to secure the climbers to the arborist/utility worker's legs.

Climbers are somewhat unique as popular and wear components such as straps and gafts are replaceable. Gaft's are very sharp! Gaft covers are available and should be used when not in use or storing.

Popular brands for climbers are Buckingham (Buck), Weaver and Spyder Manufacturing.

## FLIP LINES/LANYARDS



**Flip Lines, Lanyards and Positioning Lanyards:** Flip Lines and Lanyards consist of a variety of precut lengths of rope, typically 8 ft to 15 ft. lengths, that go around the trunk of a tree and are then attached to each side of a climber's saddle on the sewn-in side rings using carabiners and/or snap hooks. Flip lines and Lanyards are adjustable enabling the climber some range of motion while elevated.

Lanyards and flip lines can be made of solid rope with a protective covering, a rope covered aircraft style steel cable and manufactured with loops or carabiners at the ends of the product and with adjustable rope stops to adjust to the trunk size and allow additional range of motion while elevated.

Lanyards and Flip Lines are an essential tool that climbers use to ascend into the canopy of a tree by "flipping" the line above them on the trunk of the tree and climbing to the even point of the lanyard and repeating the process.

Popular Manufacturers of Lanyards and Flip Lines are: U.S Rigging/Pro Climb, Buckingham, Spyder, KONG, Teufelberger and Sterling.

## CARABINERS



**Carabiners:** Carabiners are essential hardware items for the Arborist industry. Arborist carabiners are exceptionally strong and designed and manufactured to support enormous amounts of weight and yet weigh very little. Arborist carabiners are typically constructed of steel or anodized aluminum. Their weight tolerances are sometimes measured in "kilonewtons". One kilonewton is equivalent to 224.81 pounds.

The carabiners you find at mass merchants and hardware stores are NOT arborist grade carabiners. Arborist grade carabiners are specialty products and can range in retail price from \$18.00 to 30.00 per item and have exceptional kilonewton weight limits.

When carabiners are measured for their weight capacity and tolerances, you may see three different measurements for the same carabiner. There is a major axis MBS, a minor axis MBS and a gate MBS kilonewton rating for carabiners. MBS is Minimum Breaking Strength.

**Example: Aluminum Carabiner. Weight = 3.52 ounces.**

Major Axis MBS – 30 kN or 6,744.30 pounds

Minor Axis MBS - 11 kN or 2,472.91 pounds

Inward against sleeve MBS – 6 kN or 1,348.86 pounds

Due to the serious safety nature of the arborist and utility industries, some carabineers used in this industry have multiple motions or steps needed to open a carabiner. Some are referred to a triple lock or twist lock carabiners. Some carabines may require a lift up motion on the gate cover and a twist to open the gate of the carabiner to minimize the risk of an accidental opening. Others may require the gate cover to be unscrewed to open the gate.

Carabiners come in multiple colors, shapes and designs. All carabiners have a designed purpose whether that be centering a rope, rigging a pulley, attaching to a prusik or lanyard etc. and are very versatile. Arborist often carry extra carabiners with them when they elevate in the event they need them once they are airborne.

## SNAP HOOKS



**Snap Hooks:** A snap hook resembles a large safety pin with a spring-loaded gate that opens. While some snap hooks have a simple open gate motion, snap hooks in vertical elevation applications have double or triple lock gate openings. Snap hooks can have a fixed molded ring on one side to accommodate a carabiner or rope and snap hooks can also have a swivel ring on one side to increase mobility.

Snap hooks are used on the ends of lanyards and flip lines as well as in some rigging applications and have increased MBS ratings similar to arborist carabiners.

Popular manufacturers of carabiners and snap hooks are U.S. Rigging, Rock Exotica, Spyder, CMI, Spyder, DMM and KONG.

## THROW WEIGHTS / LINES



**Throw weights & Throw lines:** A throw weight is small pouch made of Cordura material (think nylon and canvas) with #8 coated lead shot inside. The pouch has a sewn in ring that a throw line is attached to. The throw bag is thrown over a selected limb high up in a tree and the weight of the throw bag easily returns to the ground. From that point, the arborist can remove the throw bag and attach a climbing safety rope to the end of the throw line and pull it back up into the tree canopy, over the selected limb and back down to the ground. This activity secures a safety rope in the tree that will be anchored at one end to a tree trunk and the other end will be secured to the climber's saddle for ascending into the tree.

Throw bags come in multiple colors and weights. Popular weights are 12 ounce, 14 ounce and 16 ounce bags.

Throw line is small diameter hi visibility specialty line with a nonstick coating that easily slides through and over limbs.

Popular brands of throw lines are Pelican, Weaver and Spyder.

## PULLEYS



**Pulleys:** Similar to carabiners for this industry, arborist, rescue and rigging pulleys for the arbor care industry are not the standard hardware store or mass merchant fare. Arborist/Rigging pulleys come in multiple sizes, designs, functions and colors with varying levels of Minimum Breaking Strengths. For example, a large rigging block pulley can be 7" tall, weigh over 5 pounds, have an MBS rating of 33,000 lbs.

There are multiple sizes of pulleys for multiple applications within the arbor/rescue industries.

### Characteristics to be familiar with are:

Pulleys can be single sheave (roller) or double sheave.

Pulleys may also have a top sheave and a bottom sheave.

Many arborist pulleys can be opened to insert a rope and reclosed while elevated. Pulley locks can be spring loaded or screw in type or both.

Pulleys can be made of steel, anodized aluminum or a combination of both.

Some pulleys can have swivel loops as attachment point for a carabiner or rope while others have a stationary loop for attaching a carabiner or a loop.

Popular manufacturers of arbor pulleys are CMI, ISC, DMM, Rock Exotica, U.S. Rigging and KONG.

## PRUSIKS



**Prusiks:** Prusiks are small sections of rope anywhere from 28 to 40" long that are manufactured with sewn loops on each end of the rope sections. A prusik is a fantastic tool and all arborists likely have dozens of prusiks on hand.

To use a prusik, a climber would hold the two sewn loops in one hand and take the other folded end of the rope section around the secured climbing line. Then open the folded end and pull the two sewn loops through the folded end around the climbing line. Then repeat the process so that you have multiple strands of the prusik wrapped around the climbing rope with the sewn loop ends available to be clipped to a carabiner which is installed on the center saddle loop.

The uniqueness of a prusik is that while the loops of line have no weight on them, a climber can move the bunched loops by hand up or down the rope for maximum mobility. Once weight is applied to a prusik, it grabs the climbing rope and will not move.

Prusiks are excellent safety items, very popular, very easy to install and lightweight. Arbor retailers sell hundreds of prusiks. They must be in stock at all times!

*Popular diameters of prusiks are 5/16's, 7/16's, 1/2" and 5/8's. Popular lengths are 28", 30", 32", 34" 36" & 40". Most cordage manufacturer's manufacture prusiks.*

## ASCENDERS, DESCENDERS / MECHANICALS



**Ascenders & Descenders, Mechanicals:** Mechanical devices that assist arborist are sometimes collectively referred to as “Mechanicals”. They are high quality lightweight refined mechanical instruments that assist arborist in multiple applications. In some instances, mechanical devices are taking the place of old school arborist techniques. In review of recreational rock climbing, clearly some of those items have made their way into the arboriculture industry. As new generational climbers enter into the industry, mechanicals are becoming more and more popular.

Two primary mechanicals are Ascenders and Descenders. These devices are hand size items that a climber can thread a rope through and the rope can only travel through the device one way. It slips easily through the device as the climber ascends the rope and the user pushes the devices up the rope as they ascend and the device grabs the rope and will not allow it to pass back through the device. This secures the climber in place and provides a rapid ascent.



Note that there are left hand and right hand “ascenders” as well as a double ascender. A climber would use an individual ascender for each hand. A double ascender is used by the climber placing both hands side by side inside the single device already threaded with the rope and pushes both hands at once up the rope to ascend to the desired height.

Ascenders and Descenders are typically made of aluminum and are extremely light weight.

Descending requires flipping the rope stop button and allowing the rope to pass through the device in the opposite direction.



**Figure 8's:** A figure 8 is a lightweight aluminum or steel one piece device that looks like the number 8. It's purpose is to allow the controlled descent of a climber that is coming down from elevation in a tree. Some might refer to the figure 8 as “old school” descending. A figure 8 has one small loop on one end and another larger loop on the other end, again, just like the number 8. A figure 8 measures approximately 6 to 7 inches tall and perhaps 3 to 4 inches wide. A very simple but effective tool.

To use a figure 8 descender, take a bite (a small loop of the same rope, NOT twisted) of the climbing rope, and feed that bite of rope through the large O of the eight and loop the other end of the bite over the outside top of the smaller O of the figure 8. Then, connect the smaller end of the figure 8 to the carabiner that is connected to the center ring of the saddle. Right handed persons should connect the carabiner to the left of the rope so that the rope will hang off to their right and they can use the right hand as the “brake” hand and left handed people should connect the carabiner to the right hand side of the rope so that the rope can hang off to the left of the carabiner and the left hand and arm can be used as the “brake” hand.

The climber can then release their brake hand from around the rope gradually until the climbing line begins to flow back through the figure 8 and control their descent to the ground.

Note that it is highly recommended to use a back up safety system for any descent using a figure 8. The most common back up system would be to install a prusik just above the figure 8 and attached the loop ends of the prusik into the same carabiner that is hooked to the Figure 8. If the Figure 8 descent were to become too fast or the climber were to be injured or knocked unconscious on the descent, the prusik would secure them in place until rescue.

There are sister products to the figure 8's that have added soft hooks (ears or pegs) off to the side of the large O in the figure 8. They are sometimes referred to a “Big 8's”. These shaped devices are very similar to Figure 8's, operate in just about the same manner and are typically associated with rescue operations.

Videos of rigging and using Figure 8's and Big 8's is highly recommended.