

SECTION 9
Cordage

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Cordage Information

Rope Specifications

Circumferences and Diameter Values

Size is determined by linear density; diameter and circumference values given are nominal values. If a specific diameter (or circumference) value is specified, linear density and minimum breaking strength values may be different from those given in tables.

Working Loads

Minimum breaking strength is based on data from a number of manufacturers and represents a value of 2 standard deviations below the mean, as established by regression analysis. The working load of a rope shall be determined by dividing the minimum breaking strength by the design factor. Design factors range from 5 to 12 for non-critical applications.

Because of the wide range of rope use, rope conditions, exposure to the several factors affecting rope behavior, and the degree of risk to life and property involved, it is not realistic to make standard recommendations as to design factors of working loads. However, to provide guidelines, a range of design factors and working loads are provided for rope in good condition with appropriate splices, in non-critical applications and under normal service conditions. Normal service is generally considered to be use under static or very modest dynamic load conditions.

Design factors at the low end of the suggested range should only be selected with expert knowledge of conditions and a professional estimate of risk, based on the critical conditions of use listed below.

Critical Conditions of Use

Design factors at the high end of the range or larger shall be used when:

1. Small ropes are used (because they can be more severely damaged by cutting, abrasion and sunlight).
2. Loads are not accurately known.
3. Operators are poorly trained.
4. Operation/use procedures are not well defined and/or controlled.
5. Inspection is infrequent.
6. Abrasion, cutting or dirt are present.
7. Shock loads or extreme dynamic loadings are likely.
8. High temperatures are present.
9. Chemicals are present.
10. Ropes are kept in service indefinitely.
11. Tensions on the rope are maintained continuously for long periods.
12. Rope can be subject to sharp bends or is used over pulleys or surfaces with too small a radius.
13. If knots are used (because strength is reduced by up to 50%).
14. Death, injury or loss of valuable property may result from failure.

For critical applications, a design factor greater than 12 may be necessary. Users must determine the design factor as they are the only ones who can assess service conditions and establish operating procedures. The load applied to the rope shall not exceed the working load. If uncertain, contact the rope manufacturer or a qualified engineering consultant for assistance.

IN ALL CASES WHERE ANY SUCH CONDITIONS ARE PRESENT, OR THERE IS ANY QUESTION ABOUT THE LOADS INVOLVED OR THE RISKS OF USE, THE WORKING LOAD SHOULD BE SUBSTANTIALLY REDUCED AND THE ROPE INSPECTED FREQUENTLY.

Dynamic Loading

Whenever a load is picked up, stopped, moved or swung, there is an increased force due to dynamic loading. The more rapidly or suddenly such actions occur, the greater this increase will be. In extreme cases, the force put on the rope may be two, three, or even more times the normal load involved. (For instance, when picking up a tow on a slack line or using a rope to stop a falling object.) Therefore, in all such applications as towing lines, life-line, safety lines, climbing ropes, etc., design factors must reflect the added risks involved.

Users should be aware that dynamic effects are greater on a low elongation rope such as manila than on a high-elongation rope such as nylon and greater on a shorter rope than on a longer one. The range of design factors given contains provisions for very modest dynamic loads. This means that the load must be handled slowly and smoothly to minimize dynamic effects.

Special Applications

The design factor ranges are not necessarily intended to apply in those applications where a thorough engineering analysis of all conditions of use has been made by qualified professionals. In such cases, breaking strength, elongation, energy absorption, behavior under long-term or cyclic loading, and other pertinent properties and operating procedures may be evaluated to allow the selection of a design factor best suited to the requirements.

New Rope Tensile Strengths

Standard tensiles are based on actual and calculated results. With minimum tensile approximately 10% below standard. RWL based on minimum tensiles.

Caution

Never allow anyone to stand in line with or within 45° on either side of a rope under tension. Should the rope fail or other parts of the assembly fail, the recoil force could cause serious injury or damage, especially if the rope is nylon.

FAILURE OF A TENSIONED ROPE AND/OR CONNECTIONS IS A SERIOUS HAZARD. SUDDEN LOSS RELEASE FROM A TENSIONED ROPE CAN CAUSE SNAPBACK WHICH CAN RESULT IN PERSONAL INJURY OR DEATH.

Recoiling rope may oscillate violently in an unpredictable path, away from the failure point, hitting anything in its way with a great impact. Individuals in the path of the recoiling rope may be seriously hurt or even killed. Rope and its connecting hardware must be selected with sufficient safety factors for the specific dynamic use conditions; and the rope and/or connector must be inspected before each use and replaced if worn, frayed or cut.

Care & Handling of Rope

Select the Correct Size

A rope too small may fail quickly, one too large will prove expensive. Don't work any rope above one-fifth of its breaking strength.



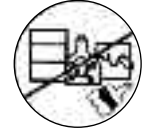
Avoid Overloads

Safe working load ranges for any new rope is between 1/5 and 1/12 of its minimum tensile. Make enough allowances for safety if your rope is old or worn. Ignoring this safety factor causes early rope replacement and is dangerous to men and materials.



Keep Away from Chemicals

Acids and Alkalis are injurious to rope. If exposed, wash thoroughly and inspect before using. Watch for battery and building cleaning acids, caustic soda and paint. Keep rats away.



Stop Unnecessary Wear

Outer and inner rope fibers contribute equally to the strength of your rope. If worn out, the rope is naturally weakened. Eliminate rubbing, dragging or working over rough surfaces. Protect its surface with chafing gear, such as canvas wrapped and tied around the rope. Pad corners of sharp objects when lifting, and avoid strain on sharp bends. Remove kinks if they form.



To Uncoil Rope

A new coil of rope should be placed flat on its side with the "tag" inside end down. Remove the outside lashings and unfasten the inside bands. Leave burlap around the coil to keep rope clean.



Reach down through the eye of coil and pull out the inside end, where tag is attached, through the eye of the coil.

Store it Properly

Keep in dry, cool place with good air circulation. Use wooden grating on concrete or steel floors, and keep away from steam pipes and metal walls. Protect from prolonged exposure to sunlight. Store only clean, dry rope.



Use Right Sheaves

Block sizes or sheaves should be eight times the diameter of the rope. For power transmission or for use with continuous load, sheaves should be at least forty times the diameter of the rope. Small sheaves cause added friction and rope wear. Keep sheaves smooth.



Watch Rope Condition

Inspect rope frequently, whether working or in storage. Occasionally reverse your rope, end-to-end, to distribute the wear more evenly.



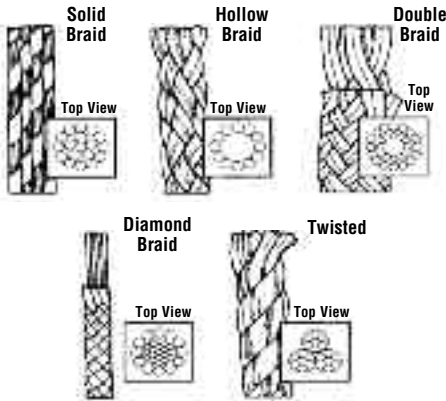
Use worn rope only where strength failure will not cause injury or damage.

***All ropes will last longer if given proper care and handling, storage and use. These are the more important points to keep in mind to assure greatest service and safety.**

Cordage

Cordage Information (cont.)

Synthetic Cordage Types



Though initially more expensive than natural fiber ropes, synthetic ropes have proven to be more efficient and cost effective long term for most end uses. Man made fiber ropes are stronger and more durable. They are generally not affected by rot or mildew, or most chemicals, and may be stored wet or dry. As a result, the service life of synthetics exceeds that of natural fiber ropes.

Each of the various types of synthetic fibers described below possesses different characteristics and properties. All of these fibers are continuous filaments of long molecular-chain polymers that extend the length of the rope. These filaments may be either extruded or spun, and are normally either termed as monofilament (larger single filaments) or multifilament (multiple smaller fibers).

Nylon

Nylon is a very strong fiber. Due to its elasticity, nylon can absorb sudden shock loads that would break ropes of other fibers. It has very good resistance to abrasion and will last many times longer than natural fiber ropes. Nylon rope is resistant to rot, oils, gasoline, grease, marine growth or most chemicals.

Polyester

Polyester is very strong, but not quite as strong as nylon rope. The difference between the two ropes is that polyester does not have the stretch and elasticity of nylon, but has better resistance to ultraviolet degradation from sunlight. Polyester is superior to nylon on wet abrasion.

Polypropylene*

A lightweight, strong rope that is extensively used in many different applications. It is a floating rope and is resistant to rot, oils, gasoline or most chemicals. Polypropylene rope is available in monofilament fiber, which is smooth surfaced, multifilament fiber, which has a somewhat velvety appearance and feel, and slit film fiber, which is produced in varying textures.

Polyethylene*

One of the best known synthetic fiber ropes. A floating rope somewhat like polypropylene except slightly heavier. Also, polyethylene's handling characteristics are a little different than polypropylene. It is not as strong as polypropylene, size for size.

Synthetic Fiber Types

Multifilament - Soft, flexible, small diameter, continuous filaments. Available in nylon, polyester and polypropylene ropes.

Monofilament - Extruded in round fibers. Not as soft or flexible as multifilament. Available in polypropylene and polyethylene ropes only.

Slit Film - Polypropylene or polyethylene is extruded in sheet film form, then slit to make flat fibers.

Spun - Very fine fibers with lengths of 1/2 to 1-1/2 inches are twisted into string then into rope. Available in cotton and polyester ropes only.

Textured - Fibers are crimped to give loft to the fiber. Available in polyester, nylon and polypropylene.

Definitions

Bonding - A liquid coating to increase resistance to abrasion and prevent water absorption.

Natural - Natural color, unbleached cotton.

White - In cotton, a specified color not to be confused with natural.

Polished (Glazed) - Cotton cordage that has been run through a gum and pigment polish to give it a high gloss.

* Special notice concerning Polypropylene & Polyethylene: Polypropylene and Polyethylene or subject to deterioration when exposed to direct sunlight. These products are designed to give you many hours of use; however, the life of the product will be extended when stored away from sunlight. The product should be replaced when signs of excessive deterioration is indicated by discoloration, broken filaments, raveling, etc.

Specifications & Technical Data

Knots Can Cut Your Strength!

Whenever possible lines should be spliced and not tied in knots.

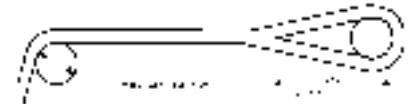
Percent of Strength Loss

| | | |
|------------------|--------|---|
| Eye Splice | 10% | Lines should not be subject to bending radius less than 3x diameter of line. Preferably 8x diameter will extend life of line. |
| In Line Splice | 10% | |
| Bowline | 35-40% | |
| Square Knot | 45-50% | |
| Two Half Hitches | 30% | |

Bends/Sheave Sizes

Sharp bends significantly reduce rope strength. A working rope should never be subjected to a bend of less than 3 times rope diameter. A bend ratio of 4 times, or more, will prolong rope life. Eye-splice length should be at least 3 times the diameter of the cylinder (bitt, etc.) over which the eye is used. A length of 5 times diameter is even better.

Sheave diameter should be 8 times braided rope diameter and 10 times twisted rope diameter. Sheave groove must be wider than rope diameter. Never use Wire rope or V-belt sheaves because they pinch fiber ropes and cause excessive friction and damage.



Never allow anyone to stand in line with or within 45° on either side of a rope under tension. Should the rope fail or other parts of the assembly fail, the recoil force could cause serious injury or damage, especially if the rope is nylon.

How Much Line Can be Stored in Box or Bin?

(Assuming line is to be dropped into and not carefully laid in)

V = Cubic footage required

C = Rope circumference in inches

L = Length of rope in feet

Example:

$$2" \text{ circ.}^2 = 4 \times 15,000 = \frac{60,000}{830} = 72 \text{ Cu. Ft. Required}$$

$$\text{Box will hold entire length. } V = \frac{C^2 \times L}{830}$$

$$4 = \frac{C^2 \times 15,000}{830}$$

$$C^2 = \frac{4 \times 830}{15,000}$$

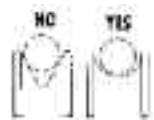
$$C = \sqrt{\frac{3,320}{15,000}}$$

How Much Line on a Drum or Reel?

$$E = \frac{A(B^2 - C^2)}{15.3 \times \text{rope dia.}^2} = L$$

Caution: Do not put line on reel under tension. To do so can cause extreme contract forces to crush drum.

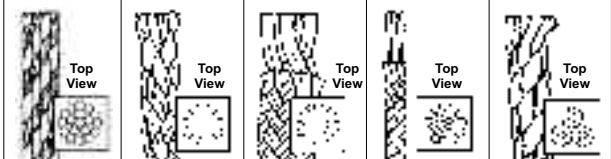
DO NOT use wire rope or V-belt sheaves for synthetic rope as rope is pinched inside.



Rope Construction Selection Guide*

| Characteristics | Solid Braid | Hollow Braid | Double Braid | Diamond Braid | Twisted |
|----------------------------------|-------------|--------------|--------------|---------------|---------|
| No. of Strands or Carriers | 9, 12 or 18 | 8, 12 or 16 | 16, 24 or 32 | 8 or 16 | 3 |
| Spliceable | No | Yes | Yes | No | Yes |
| Strength to Weight | 5 | 2 | 1 | 4 | 3 |
| Flexibility | 3 | 1 | 2 | 4 | 5 |
| Flattens Under Load | No | Yes | No | Yes | No |
| Rotates Under Load | No | No | No | No | Yes |
| Mechanical Elongation | 1 | 4 | 5 | 3 | 2 |
| Cost Per Size | 2 | 4 | 1 | 3 | 5 |
| Working Load (as a % of Tensile) | 15-20% | 15-20% | 15-20% | 15-20% | 8-14% |
| Abrasion Resistance | 1 | 5 | 2 | 3 | 4 |

WARNING: This guide is designed for general reference only. The construction comparisons assume using the same rope fiber & size. Expert advice should be sought when choosing a rope where protection of life or property is involved.



Cordage Information & Ropes

Rope Fiber Selection Guide: Fiber Properties - Typical Values

| | Manila | Sisal | Cotton | Nylon | Polyester | Polypropylene | Polyethene | Kevlar ¹ | Spectra ² |
|--|---------------------------------|---------------------------------|--------------------------------------|----------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|---------------------------------|-------------------------------------|
| STRENGTH: Breaking Tenacity – Dry (grams/denier) Wet Strength vs. Dry Strength Shock-load Absorption Ability | 5.0 - 6.0 Up to 120% Poor | 4.0 - 5.0 Up to 120% Poor | 2.0 - 3.0 Up to 120% Very Poor | 7.0 - 9.5 85-90% Excellent | 7.0 - 9.5 100% Good | 6.5 100% Very Good | 6.0 100% Fair | 18 - 26.5 95% Poor | 30.0 100% Fair |
| WEIGHT: Specific Gravity Floats | 1.38 No | 1.38 No | 1.54 No | 1.14 No | 1.38 No | 0.91 Yes | 0.95 Yes | 1.44 No | 0.97 No |
| ELONGATION: Percent of Break Creep (extension under sustained load) | 10 - 12% Very Low | 10 - 12% Very Low | 5 - 12% Very Low | 18 - 25% Moderate | 12 - 15% Low | 15 - 25% High | 15 - 25% High | 1.5 - 3.6% Very Low | 3.5% Moderate |
| EFFECTS OF MOISTURE: Water Absorp. of Indiv. Fibers Dielectric Properties | Up to 100% Very Poor | Up to 100% Very Poor | Up up to 100% Very Poor | 2 - 8% Poor | <1% Good | None Excellent | None Excellent | 3.5 - 7.0% Poor | None Excellent |
| DEGRADATION: Resistance to UV Sunlight Resistance to Rot Mildew Storage Requirements | Good Poor Dry Only | Good Poor Dry Only | Good Poor Dry Only | Good Excellent Wet or Dry | Excellent Excellent Wet or Dry | Poor* Excellent Wet or Dry | Fair* Excellent Wet or Dry | Fair Excellent Wet or Dry | Fair Excellent Wet or Dry |
| ROPE ABRASION RESISTANCE: Surface Internal | Good Fair | Fair Fair | Poor Fair | Very Good Excellent | Excellent Excellent | Good Good | Good Good | Fair Fair | Very Good Excellent |
| THERMAL PROPERTIES: Melts at | Does Not Melt Chars at 350° | Does Not Melt Chars at 350° | Does Not Melt Chars at 300° | 420 - 480° | 490 - 500° | 330° | 275° | 800°-Begins to Decompose | 297° |
| RESISTANCE³: Resistance to Acids Resistance to Alkalis Resistance to Oils & Gas | Poor Poor Poor | Poor Poor Fair | Poor Fair Poor | Fair Very Good Very Good | Good Fair Very Good | Excellent Excellent Very Good | Excellent Excellent Very Good | Fair Fair Very Good | Excellent Excellent Very Good |

* Black is best 1 - Based on Dupont Kevlar® Data 2 - Based on Allied/Signa; Spectra® Data - Type 990
3 - Resistance is relative to the length of exposure, percent of concentration & temperature.

TWISTED ROPES

Nylon Rope

- Four stage construction
- High strength and elasticity
- Medium-Soft Lay
- Color: Natural White

| Dia. (in) | Size No. | Nominal Dia. Dec. Equiv. | Standard Tensile (lbs) | Minimum Tensile (lbs) | Units -Spool- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|----------|--------------------------|------------------------|-----------------------|--------------------|----------------------|-----------------------------|
| 1/4 | 3/4 | 0.250 | 1,650 | 1,490 | 600 | 298 - 124 | 1.5 |
| 5/16 | 1 | 0.313 | 2,550 | 2,300 | " | 460 - 192 | 2.5 |
| 3/8 | 1-1/8 | 0.375 | 3,750 | 3,340 | " | 668 - 278 | 3.5 |
| 1/2 | 1-1/2 | 0.500 | 6,400 | 5,750 | " | 1,150 - 479 | 6.5 |
| 5/8 | 2 | 0.625 | 10,000 | 9,000 | " | 1,800 - 750 | 10.0 |
| 3/4 | 2-1/2 | 0.75 | 14,200 | 12,800 | " | 2,560 - 1,067 | 14.5 |
| 7/8 | 2-3/4 | 0.875 | 20,000 | 18,000 | " | 3,600 - 1,500 | 20.0 |
| 1 | 3 | 1.000 | 25,000 | 22,600 | " | 4,520 - 1,883 | 26.0 |
| 1-1/8 | 3-1/2 | 1.125 | 32,000 | 28,800 | " | 5,760 - 2,400 | 32.5 |
| 1-1/4 | 3-3/4 | 1.250 | 37,500 | 33,800 | " | 6,760 - 2,817 | 40.0 |
| 1-1/2 | 4-1/2 | 1.500 | 53,000 | 47,800 | " | 9,560 - 3,983 | 55.0 |
| 1-5/8 | 5 | 1.625 | 65,000 | 58,500 | " | 11,700 - 4,875 | 66.5 |
| 2 | 6 | 2.000 | 92,000 | 83,000 | " | 16,600 - 6,917 | 95.0 |
| 2-1/4 | 7 | 2.250 | 125,000 | 113,000 | " | 22,600 - 9,417 | 129.0 |
| 2-1/2 | 7-1/2 | 2.500 | 140,000 | 126,000 | " | 25,200 - 10,500 | 149.0 |
| 2-5/8 | 8 | 2.625 | 162,000 | 146,000 | " | 29,200 - 12,167 | 168.0 |
| 3 | 9 | 3.000 | 200,000 | 180,000 | " | 36,000 - 15,000 | 210.0 |
| 4 | 12 | 4.000 | 360,000 | 324,000 | " | 64,800 - 27,000 | 379.0 |

*RWL = Recommended Work Load

Cotton

- Pioneer™ Brand
- Cotton and synthetic blend
- Soft, easy to handle
- Knots easily
- Color: Natural White

| Dia. (in) | Size No. | Nominal Std. Dia. Dec. Equiv. | Min. Tensile (lbs) | Units Tensile (lbs) | RWL -Spool- (ft) | Approx. 5:1 - 12:1 (lbs) | Density (lbs./100') |
|-----------|----------|-------------------------------|--------------------|---------------------|------------------|--------------------------|---------------------|
| 3/16 | 5/8 | 0.188 | 280 | 252 | 600 | 50 - 21 | 1.1 |
| 1/4 | 3/4 | 0.250 | 470 | 423 | " | 85 - 35 | 1.8 |
| 3/8 | 1-1/8 | 0.375 | 990 | 891 | " | 178 - 74 | 4.1 |
| 1/2 | 1-1/2 | 0.500 | 1,615 | 1,454 | " | 291 - 121 | 7.0 |
| 5/8 | 2 | 0.625 | 2,450 | 2,205 | " | 441 - 184 | 11.0 |
| 3/4 | 2-1/4 | 0.750 | 3,445 | 3,101 | " | 620 - 258 | 15.9 |

TWISTED ROPES

Polyester

- Continuous multifilament yarn
- Low stretch
- Good abrasion resistance
- Excellent UV resistance
- Color: Natural White

| Dia. (in) | Size No. | Nominal Dia. Dec. Equiv. | Standard Tensile (lbs) | Minimum Tensile (lbs) | Units -Spool- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|----------|--------------------------|------------------------|-----------------------|--------------------|----------------------|-----------------------------|
| 3/8 | 1-1/8 | 0.375 | 3,700 | 3,340 | 600 | 668 - 278 | 4.5 |
| 7/16 | 1-1/4 | 0.438 | 5,000 | 4,500 | " | 900 - 375 | 6.2 |
| 1/2 | 1-1/2 | 0.500 | 6,400 | 5,750 | " | 1,150 - 479 | 8.0 |
| 5/8 | 2 | 0.625 | 9,550 | 8,600 | " | 1,720 - 717 | 12.3 |
| 3/4 | 2-1/4 | 0.750 | 12,500 | 11,300 | " | 2,260 - 942 | 17.5 |
| 7/8 | 2-3/4 | 0.875 | 17,000 | 15,250 | " | 3,050 - 1,271 | 23.4 |
| 1 | 3 | 1.000 | 22,000 | 19,800 | " | 3,960 - 1,650 | 30.4 |
| 1-1/8 | 3-1/2 | 1.125 | 27,500 | 24,800 | " | 4,960 - 2,067 | 38.2 |
| 1-1/4 | 3-3/4 | 1.250 | 33,200 | 29,800 | " | 5,960 - 2,483 | 46.5 |
| 1-1/2 | 4-1/2 | 1.500 | 46,800 | 42,200 | " | 8,440 - 3,517 | 67.0 |
| 1-5/8 | 5 | 1.625 | 55,500 | 50,000 | " | 10,000 - 4,167 | 79.0 |
| 2 | 6 | 2.000 | 80,000 | 72,000 | " | 14,400 - 6,000 | 118.0 |
| 2-1/4 | 7 | 2.250 | 100,500 | 90,500 | " | 18,100 - 7,542 | 148.0 |
| 2-1/2 | 7-1/2 | 2.500 | 122,000 | 110,000 | " | 22,000 - 9,167 | 181.0 |
| 2-5/8 | 8 | 2.625 | 137,000 | 123,000 | " | 24,600 - 10,250 | 204.0 |
| 3 | 9 | 3.000 | 174,000 | 157,000 | " | 31,400 - 13,083 | 258.0 |

Multiplex Polyester

- DuPont T77 Multiplex™
- High stretch, low stretch
- Good abrasion & UV resistance
- Soft/fuzzy surface for ease of handling
- Excellent grip
- Eye splice is factory installed
- Color: Natural White

| Dia. (in) | Size No. | Nominal Dia. Dec. Equiv. | Standard Tensile (lbs) | Minimum Tensile (lbs) | Units -Spool- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|----------|--------------------------|------------------------|-----------------------|--------------------|----------------------|-----------------------------|
| 3/8 | 1-1/8 | 0.375 | 3,350 | 3,015 | 600 | 603 - 251 | 4.2 |
| 1/2 | 1-1/2 | 0.500 | 5,750 | 5,175 | " | 1,035 - 431 | 7.4 |
| 5/8 | 2 | 0.625 | 9,000 | 8,100 | " | 1,620 - 675 | 11.6 |
| 3/4 | 2-1/4 | 0.750 | 14,000 | 12,600 | " | 2,520 - 1,050 | 18.1 |

Cordage

Ropes

TWISTED ROPES

Combination Lockline

- Superlock™ Brand. Specifically designed for river boat traffic
- Made from blend of polyolefin and DuPont® Dacron® Multiflex™ polyester yarns
- Strong, yet light weight rope
- Good handling
- Excellent heat, abrasion and friction resistance
- Color: Natural White

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Standard Tensile (lbs) | Minimum Tensile (lbs) | Units -Spool- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|------------------|------------------|------------------------|-----------------------|--------------------|----------------------|-----------------------------|
| 1-1/2 | 4-1/2 | 1.500 | 36,000 | 32,400 | 600 | 6,480 - 2,700 | 45 |
| 1-5/8 | 5 | 1.625 | 43,500 | 39,150 | " | 7,830 - 3,263 | 54 |
| 1-3/4 | 5-1/2 | 1.750 | 50,000 | 45,000 | " | 9,000 - 3,750 | 62 |
| 2 | 6 | 2.000 | 64,000 | 57,600 | " | 11,520 - 4,800 | 80 |
| 2-1/4 | 7 | 2.250 | 82,000 | 73,800 | " | 14,760 - 6,150 | 102 |
| 2-1/2 | 7-1/2 | 2.500 | 95,000 | 85,500 | " | 17,100 - 7,125 | 125 |
| 2-5/8 | 8 | 2.625 | 104,000 | 93,600 | " | 18,720 - 7,800 | 139 |

Combination Rope

- Hi-Power™ Brand
- Polyester & copolymer yarn combination for added strength
- Holds knots well
- Good dielectric properties
- Color: White rope with marker

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Spool- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|------------------|------------------|--------------------|--------------------|--------------------|----------------------|-----------------------------|
| 3/8 | 1-1/8 | 0.375 | 3,250 | 2,925 | 600 | 585 - 244 | 3.6 |
| 1/2 | 1-1/2 | 0.500 | 5,200 | 4,680 | " | 936 - 390 | 6.5 |
| 5/8 | 2 | 0.625 | 7,400 | 6,660 | " | 1,332 - 555 | 9.5 |
| 3/4 | 2-1/4 | 0.750 | 9,700 | 8,730 | " | 1,746 - 728 | 12.5 |
| 7/8 | 2-3/4 | 0.875 | 11,450 | 10,300 | " | 2,060 - 858 | 17.0 |
| 1 | 3 | 1.000 | 14,550 | 13,100 | " | 2,620 - 1,092 | 21.8 |
| 1-1/8 | 3-1/2 | 1.125 | 18,150 | 16,350 | " | 3,270 - 1,363 | 27.5 |
| 1-1/4 | 3-3/4 | 1.250 | 22,000 | 19,800 | " | 3,960 - 1,650 | 33.4 |
| 1-1/2 | 4-1/2 | 1.500 | 29,800 | 26,800 | " | 5,360 - 2,233 | 45.0 |
| 1-5/8 | 5 | 1.625 | 36,000 | 32,400 | " | 6,480 - 2,700 | 55.5 |
| 2 | 6 | 2.000 | 52,000 | 46,800 | " | 9,360 - 3,900 | 78.0 |
| 2-1/4 | 7 | 2.250 | 68,900 | 62,000 | " | 12,400 - 5,167 | 105.0 |
| 2-1/2 | 7-1/2 | 2.500 | 80,000 | 72,000 | " | 14,400 - 6,000 | 122.0 |
| 2-5/8 | 8 | 2.625 | 90,000 | 81,000 | " | 16,200 - 6,750 | 138.0 |
| 3 | 9 | 3.000 | 114,400 | 103,000 | " | 20,600 - 8,583 | 174.0 |

Monofilament Polypropylene

- Premium grade 100% monofilament
- Moderate elongation
- Versatile and economical
- Floats
- * Longer lengths available upon request

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Spool- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|------------------|------------------|--------------------|--------------------|--------------------|----------------------|-----------------------------|
| 3/16 | 5/8 | 0.188 | 800 | 720 | 600 | 144 - 600 | .7 |
| 1/4 | 3/4 | 0.250 | 1,250 | 1,130 | " | 226 - 94 | 1.2 |
| 5/16 | 1 | 0.313 | 1,900 | 1,710 | " | 342 - 143 | 1.8 |
| 3/8 | 1-1/8 | 0.375 | 2,700 | 2,440 | " | 488 - 203 | 2.7 |
| 7/16 | 1-1/4 | 0.438 | 3,500 | 3,160 | " | 632 - 263 | 3.8 |
| 1/2 | 1-1/2 | 0.500 | 4,200 | 3,780 | " | 756 - 315 | 4.7 |
| 5/8 | 2 | 0.625 | 6,200 | 5,600 | " | 1,120 - 467 | 7.5 |
| 3/4 | 2-1/4 | 0.750 | 8,500 | 7,650 | " | 1,530 - 638 | 10.7 |
| 7/8 | 2-3/4 | 0.875 | 11,500 | 10,400 | " | 2,080 - 867 | 15.0 |
| 1 | 3 | 1.000 | 14,000 | 12,600 | " | 2,520 - 1,050 | 18.0 |
| 1-1/4 | 3-3/4 | 1.250 | 21,000 | 18,900 | " | 3,780 - 1,575 | 27.0 |
| 1-1/2 | 4-1/2 | 1.500 | 29,700 | 26,800 | " | 5,360 - 2,233 | 38.4 |
| 2 | 6 | 2.000 | 52,000 | 46,800 | " | 9,360 - 3,900 | 69.0 |
| 2-1/4 | 7 | 2.250 | 69,000 | 62,000 | " | 12,400 - 5,167 | 92.0 |
| 2-1/2 | 7-1/2 | 2.500 | 80,000 | 72,000 | " | 14,400 - 6,000 | 107.0 |
| 3 | 9 | 3.000 | 114,000 | 103,000 | " | 20,600 - 8,583 | 153.0 |

TWISTED ROPES

Unmanila™

- Stronger, lighter and less expensive than natural fiber manila rope
- Film polypropylene
- Holds knots well
- Good handling
- Color: Tan

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Spool- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|------------------|------------------|--------------------|--------------------|--------------------|----------------------|-----------------------------|
| 1/4 | 3/4 | 0.250 | 900 | 810 | 600 | 162 - 68 | 1.1 |
| 5/16 | 1 | 0.313 | 1,350 | 1,215 | " | 243 - 101 | 1.6 |
| 3/8 | 1-1/8 | 0.375 | 2,100 | 1,890 | " | 378 - 158 | 2.6 |
| 1/2 | 1-1/2 | 0.500 | 3,350 | 3,015 | " | 603 - 251 | 4.2 |
| 5/8 | 2 | 0.625 | 5,000 | 4,500 | " | 900 - 375 | 6.3 |
| 3/4 | 2-1/4 | 0.750 | 7,500 | 6,750 | " | 1,350 - 563 | 10.1 |
| 1 | 3 | 1.000 | 11,650 | 10,485 | " | 2,097 - 874 | 16.3 |

Sisal

- Economical rope
- Natural fiber
- For use in non-critical applications
- Color: Tan

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Spool- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|------------------|------------------|--------------------|--------------------|--------------------|----------------------|-----------------------------|
| 1/4 | 3/4 | 0.250 | 530 | 480 | 1200 | 96 - 40 | 1.9 |
| 3/8 | 1-1/8 | 0.375 | 1,200 | 1,080 | 600 | 216 - 90 | 3.9 |
| 1/2 | 1-1/2 | 0.500 | 2,350 | 2,120 | " | 424 - 177 | 7.2 |
| 5/8 | 2 | 0.625 | 3,900 | 3,520 | " | 704 - 293 | 12.7 |
| 3/4 | 2-1/4 | 0.750 | 4,800 | 4,320 | " | 864 - 360 | 15.9 |

Manila

- Traditional three-strand rope
- Holds knots well
- Absorbs water
- Subject to rot
- Color: Tan

| Nominal Dia. (in) | Units -Spool- (ft) | Tensile Strength. (lbs) | RWL (lbs) | Approx. Wt. per coil (lbs) |
|-------------------|--------------------|-------------------------|-----------|----------------------------|
| 3/16 | 1600 | 405 | 81 | 25 |
| 1/4 | 1200 | 540 | 108 | 25 |
| 1/4 | 2400 | 540 | 108 | 50 |
| 5/16 | 850 | 900 | 180 | 25 |
| 5/16 | 1700 | 900 | 180 | 50 |
| 3/8 | 600 | 1,215 | 243 | 25 |
| 3/8 | 1200 | 1,215 | 243 | 50 |
| 7/16 | 600 | 1,575 | 315 | 32 |
| 1/2 | 600 | 2,385 | 477 | 45 |
| 1/2 | 1200 | 2,385 | 477 | 90 |
| 5/8 | 600 | 3,960 | 792 | 82 |
| 5/8 | 1200 | 3,960 | 792 | 164 |
| 3/4 | 600 | 4,860 | 972 | 104 |
| 3/4 | 1200 | 4,860 | 972 | 208 |
| 13/16 | 600 | 5,850 | 1170 | 117 |
| 7/8 | 600 | 6,930 | 1386 | 139 |
| 1 | 300 | 8,100 | 1620 | 81 |
| 1 | 600 | 8,100 | 1620 | 162 |
| 1 | 1200 | 8,100 | 1620 | 324 |
| 1-1/4 | 600 | 12,150 | 2430 | 251 |
| 1-1/2 | 600 | 16,650 | 3330 | 364 |
| 2 | 600 | 27,900 | 5580 | 624 |

SOLID BRAID ROPES

Solid braid ropes are constructed of various bundles of fiber interlocked together in a circular braiding pattern.

Polyester

- Excellent UV resistance
- Low Stretch
- Works well in pulleys
- Good abrasion resistance
- Color: Natural White

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Reel- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|------------------|------------------|--------------------|--------------------|-------------------|----------------------|-----------------------------|
| 1/8 | 4 | 0.125 | 385 | 347 | 1000 | 69 - 29 | 0.4 |
| 3/16 | 6 | 0.188 | 900 | 810 | " | 162 - 68 | 1.1 |
| 1/4 | 8 | 0.250 | 1,425 | 1,283 | " | 257 - 107 | 1.8 |
| 3/8 | 12 | 0.375 | 3,000 | 2,700 | 500 | 540 - 225 | 4.0 |
| 1/2 | 16 | 0.500 | 5,000 | 4,500 | " | 900 - 375 | 7.1 |

Ropes

SOLID BRAID ROPES

Solid braid ropes are constructed of various bundles of fiber interlocked together in a circular braiding pattern.

Proline® Multifilament Poly

- Inexpensive
- Holds knots well
- Floats
- Flexible
- Color: Natural White

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Reel- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|-----------|------------------|------------------|--------------------|--------------------|-------------------|----------------------|----------------------------|
| 1/8 | 4 | 0.125 | 175 | 158 | 1000 | 32 - 13 | 0.2 |
| 3/16 | 6 | 0.188 | 450 | 405 | " | 81 - 34 | 0.6 |
| 1/4 | 8 | 0.250 | 725 | 653 | " | 131 - 54 | 1.1 |
| 3/8 | 12 | 0.375 | 1,400 | 1,260 | 500 | 252 - 105 | 2.4 |
| 1/2 | 16 | 0.500 | 2,200 | 1,980 | " | 396 - 165 | 4.0 |

Nylon

- Strong
- Good UV resistance
- Works well in pulleys
- Good general purpose cord
- Color: Natural White

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Reel- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|-----------|------------------|------------------|--------------------|--------------------|-------------------|----------------------|----------------------------|
| 3/32 | 3 | 0.094 | 275 | 248 | 1000 | 50 - 21 | 0.2 |
| 7/64 | 3-1/2 | 0.109 | 325 | 293 | " | 59 - 24 | 0.3 |
| 1/4 | 4 | 0.125 | 400 | 360 | " | 72 - 30 | 0.4 |
| 5/32 | 5 | 0.156 | 600 | 540 | " | 108 - 45 | 0.6 |
| 3/16 | 6 | 0.188 | 850 | 765 | " | 153 - 64 | 0.8 |
| 1/4 | 8 | 0.250 | 1,300 | 1,170 | " | 234 - 98 | 1.3 |
| 5/16 | 10 | 0.313 | 1,950 | 1,755 | 500 | 351 - 146 | 2.0 |
| 3/8 | 12 | 0.375 | 2,750 | 2,475 | " | 495 - 206 | 2.9 |
| 1/2 | 16 | 0.500 | 4,200 | 3,780 | " | 756 - 315 | 5.1 |

SASH BRAID ROPES

Twirl® Sash Cord

- Premium blend quality
- Cotton blend
- Nylon core for added strength
- Polished for better abrasion resistance
- Color: Natural White with blue striker

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Hank- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|-----------|------------------|------------------|--------------------|--------------------|-------------------|----------------------|----------------------------|
| 1/4 | 8 | 0.250 | 1,075 | 968 | 100 | 194 - 81 | 1.8 |
| 5/16 | 10 | 0.313 | 1,600 | 1,440 | " | 288 - 120 | 2.7 |
| 3/8 | 12 | 0.375 | 2,150 | 1,935 | " | 387 - 161 | 3.8 |

Southgate® Sash Cord

- Cotton blend cover
- Top selling sash cord
- Moderate price
- Synthetic core for added strength
- Color: Natural White

| Dia. (in.) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Hank- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|------------|------------------|------------------|--------------------|--------------------|-------------------|----------------------|----------------------------|
| 3/16 | 6 | 0.188 | 275 | 248 | 100 | 50 - 21 | 0.7 |
| 7/32 | 7 | 0.219 | 400 | 360 | " | 72 - 30 | 1.0 |
| 1/4 | 8 | 0.250 | 495 | 446 | " | 89 - 37 | 1.2 |
| 5/16 | 10 | 0.313 | 750 | 675 | " | 135 - 56 | 2.0 |
| 3/8 | 12 | 0.375 | 1,050 | 945 | " | 189 - 79 | 2.8 |
| 1/2 | 16 | 0.500 | 1,925 | 1,733 | " | 347 - 144 | 5.2 |

Mangolia® Sash Cord

- Cotton blend cover
- Stays round under load
- Economical
- Color: Natural White

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Hank- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|-----------|------------------|------------------|--------------------|--------------------|-------------------|----------------------|----------------------------|
| 3/16 | 6 | 0.188 | 160 | 144 | 100 | 29 - 12 | 0.7 |
| 7/32 | 7 | 0.219 | 210 | 189 | " | 38 - 16 | 0.9 |
| 1/4 | 8 | 0.250 | 275 | 248 | " | 50 - 21 | 1.1 |
| 5/16 | 10 | 0.313 | 375 | 338 | " | 68 - 28 | 1.7 |
| 3/8 | 12 | 0.375 | 475 | 428 | " | 86 - 36 | 2.4 |

DOUBLE BRAID ROPES

Double braid ropes are actually two ropes in one and are sometimes called braid on braid ropes. The jacket is braided over a braided core.

Nylon

- Gold Braid® Brand
- Resists abrasion and snagging
- Excellent shock absorbing elasticity
- Torque-free
- Spliceable
- Color: White and Gold

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Spool- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|------------------|------------------|--------------------|--------------------|--------------------|----------------------|-----------------------------|
| 1/4 | 3/4 | 0.250 | 1,850 | 1,665 | 600 | 330 - 138 | 1.6 |
| 5/16 | 1 | 0.313 | 2,850 | 2,570 | " | 514 - 214 | 2.4 |
| 3/8 | 1-1/8 | 0.375 | 4,100 | 3,700 | " | 740 - 308 | 3.5 |
| 1/2 | 1-1/2 | 0.500 | 7,275 | 6,550 | " | 1,310 - 546 | 6.3 |
| 5/8 | 2 | 0.625 | 11,300 | 10,200 | " | 2,040 - 850 | 9.8 |
| 3/4 | 2-1/4 | 0.750 | 16,300 | 14,700 | " | 2,940 - 1,225 | 14.1 |
| 7/8 | 2-3/4 | 0.875 | 22,100 | 19,900 | " | 3,980 - 1,658 | 19.1 |
| 1 | 3 | 1.00 | 28,900 | 26,000 | " | 5,200 - 2,167 | 25.0 |

Polyester

- Rhino Flex™ Brand
- Torque-free
- Low stretch, high stretch
- Resistant to ultraviolet degradation
- Good dielectric properties
- Color: White with gold Tracer

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Spool- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs./100') |
|-----------|------------------|------------------|--------------------|--------------------|--------------------|----------------------|-----------------------------|
| 1/4 | 3/4 | 0.250 | 2,500 | 2,250 | 600 | 450 - 188 | 2.1 |
| 3/8 | 1-1/8 | 0.375 | 5,650 | 5,085 | " | 1,017 - 424 | 4.5 |
| 1/2 | 1-1/2 | 0.500 | 9,900 | 8,910 | " | 1,782 - 743 | 8.0 |
| 5/8 | 2 | 0.625 | 15,000 | 13,500 | " | 2,700 - 1,125 | 12.5 |
| 3/4 | 2-1/4 | 0.750 | 21,000 | 18,900 | " | 3,780 - 1,575 | 17.9 |
| 7/8 | 2-3/4 | 0.875 | 28,000 | 25,200 | " | 5,040 - 2,100 | 24.4 |
| 1 | 3 | 1.000 | 37,200 | 33,480 | " | 6,696 - 2,790 | 33.3 |
| 1-1/8 | 3-1/2 | 1.125 | 46,400 | 41,760 | " | 8,352 - 3,480 | 42.2 |
| 1-1/4 | 3-3/4 | 1.250 | 54,000 | 48,600 | " | 9,720 - 4,050 | 49.8 |
| 1-1/2 | 4-1/2 | 1.500 | 76,000 | 68,400 | " | 13,680 - 5,700 | 71.8 |
| 1-5/8 | 5 | 1.625 | 88,000 | 79,200 | " | 15,840 - 6,600 | 84.0 |

DIAMOND BRAID ROPES

Diamond braid ropes are constructed from various bundles of fiber braided in a heringbone pattern to form a jacket over a parallel fiber center core. These are also referred to as maypole braids.

Nilo™ Nylon

- High stretch, low abrasion
- Resistant to most chemicals, including gas and oils
- Chemically treated to increase abrasion resistance
- Color: N73 - Natural White/N74 - Bonded

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Reel- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|-----------|------------------|------------------|--------------------|--------------------|-------------------|----------------------|----------------------------|
| 7/64 | 3-1/2 | 0.109 | 325 | 293 | 1000 | 59 - 24 | 0.3 |
| 1/8 | 4 | 0.125 | 410 | 369 | " | 74 - 31 | 0.4 |
| 9/64 | 4-1/2 | 0.141 | 525 | 473 | " | 95 - 39 | 0.5 |
| 5/32 | 5 | 0.156 | 625 | 563 | " | 113 - 47 | 0.6 |
| 3/16 | 6 | 0.188 | 875 | 788 | " | 158 - 66 | 0.9 |
| 1/4 | 8 | 0.250 | 1,400 | 1,260 | " | 252 - 105 | 1.7 |

Zenith™ Brand Polyester

- Diamond braid polyester jacket with a strong synthetic core
- Strong, durable, economically priced.
- Low stretch
- Excellent resistance to ultraviolet degradation.
- Color: Natural White Bonded Zenith™ is chemically coated to increase abrasion resistance. Black bonded coating is available on request

| Dia. (in) | Nominal Size No. | Dia. Dec. Equiv. | Standard Tensile (lbs) | Minimum Tensile (lbs) | Units -Reel- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|-----------|------------------|------------------|------------------------|-----------------------|-------------------|----------------------|----------------------------|
| 1/8 | 4 | 0.125 | 425 | 383 | 1000 | 77 - 32 | 0.4 |
| 5/32 | 5 | 0.156 | 615 | 554 | " | 111 - 46 | 0.7 |
| 3/16 | 6 | 0.188 | 800 | 720 | " | 144 - 60 | 1.0 |
| 7/32 | 7 | 0.219 | 950 | 855 | " | 171 - 71 | 1.3 |
| 1/4 | 8 | 0.250 | 1,100 | 990 | " | 198 - 83 | 1.7 |
| 5/16 | 10 | 0.313 | 1,600 | 1,440 | 500 | 288 - 120 | 2.6 |
| 3/8 | 12 | 0.375 | 2,000 | 1,800 | " | 360 - 150 | 3.6 |

Cordage

Ropes & Twines

DIAMOND BRAID ROPES

Diamond braid ropes are constructed from various bundles of fiber braided in a heringbone pattern to form a jacket over a parallel fiber center core. These are also referred to as maypole braids.

Multifilament Polypropylene

- Angola™ Brand
- Color: White
- Flexible, light weight
- Excellent handling and knot holding ability
- Resistant to rot, mildew, petroleum products, and most chemicals

| Dia. (in) | Size No. | Nominal Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Reel- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|-----------|----------|--------------------------|--------------------|--------------------|-------------------|----------------------|----------------------------|
| 1/8 | 4 | 0.125 | 185 | 167 | 1000 | 33 - 14 | 0.3 |
| 5/32 | 5 | 0.156 | 285 | 257 | " | 51 - 21 | 0.5 |
| 3/16 | 6 | 0.188 | 405 | 365 | " | 73 - 30 | 0.6 |
| 7/32 | 7 | 0.219 | 540 | 486 | " | 97 - 41 | 0.9 |
| 1/4 | 8 | 0.250 | 700 | 630 | " | 126 - 53 | 1.1 |
| 5/16 | 10 | 0.313 | 1,075 | 968 | 500 | 194 - 81 | 1.8 |
| 3/8 | 12 | 0.375 | 1,275 | 1,148 | " | 230 - 96 | 2.2 |

HOLLOW/SINGLE BRAIDS

These lines are constructed of various bundles of fiber braided over and under each other in a circular direction. This rope has no core.

Polyester

- Esterplex™ Brand
- 12-Strand, 100% high tenacity polyester
- Very high mechanical efficiency
- Color: Natural White. Also available in Rhino Kote® colors
- Easily spliced

| Dia. (in) | Size No. | Nominal Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Reel- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|-----------|----------|--------------------------|--------------------|--------------------|-------------------|----------------------|----------------------------|
| 3/8 | 1-1/8 | 0.375 | 6,000 | 5,400 | 1000 | 1,080 - 450 | 4.3 |
| 1/2 | 1-1/2 | 0.500 | 11,200 | 10,080 | " | 2,016 - 840 | 8.0 |
| 5/8 | 2 | 0.625 | 17,500 | 15,750 | " | 3,150 - 1,313 | 12.5 |
| 3/4 | 2-1/4 | 0.750 | 23,000 | 20,700 | " | 4,140 - 1,725 | 17.0 |

8 Carrier Premium Polypropylene

- Versatile and easily spliced
- Resistant to rot, mildew, petroleum products and most chemicals
- Can be stored wet or dry
- Floats
- Color: Yellow. Other colors available on request

| Dia. (in) | Size No. | Nominal Dia. Dec. Equiv. | Standard Tensile (lbs) | Minimum Tensile (lbs) | Units -Reel- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|-----------|----------|--------------------------|------------------------|-----------------------|-------------------|----------------------|----------------------------|
| 3/16 | 5/8 | 0.188 | 675 | 608 | 1000 | 122 - 51 | 0.6 |
| 1/4 | 3/4 | 0.250 | 1,100 | 990 | " | 198 - 83 | 1.0 |
| 5/16 | 1 | 0.313 | 1,500 | 1,350 | " | 270 - 113 | 1.4 |
| 3/8 | 1-1/8 | 0.375 | 2,050 | 1,845 | " | 369 - 154 | 1.9 |
| 1/2 | 1-1/2 | 0.500 | 3,400 | 3,060 | " | 612 - 255 | 3.2 |
| 5/8 | 2 | 0.625 | 6,400 | 5,760 | " | 1,152 - 408 | 5.8 |
| 3/4 | 2-1/4 | 0.750 | 9,200 | 8,280 | " | 1,656 - 690 | 8.3 |

8 Carrier Economy Polypropylene

- Mariner™ Brand
- Spliceable hollow braid polypropylene
- Resistant to rot, mildew, petroleum products, and most chemicals
- Can be stored wet or dry
- Color: Yellow. Other colors available on request

| Dia. (in) | Size No. | Nominal Dia. Dec. Equiv. | Std. Tensile (lbs) | Min. Tensile (lbs) | Units -Reel- (ft) | RWL 5:1 - 12:1 (lbs) | Approx. Density (lbs/100') |
|-----------|----------|--------------------------|--------------------|--------------------|-------------------|----------------------|----------------------------|
| 1/8 | 3/8 | 0.125 | 250 | 225 | 1000 | 45 - 19 | 0.20 |
| 3/16 | 5/8 | 0.188 | 475 | 428 | " | 86 - 36 | 0.40 |
| 1/4 | 3/4 | 0.250 | 900 | 810 | " | 162 - 68 | 0.80 |
| 5/16 | 1 | 0.313 | 1,275 | 1,148 | " | 230 - 96 | 1.19 |
| 3/8 | 1-1/8 | 0.375 | 1,525 | 1,373 | " | 275 - 144 | 1.40 |
| 1/2 | 1-1/2 | 0.500 | 2,725 | 2,453 | " | 491 - 204 | 2.43 |

TWINES

Twines are constructed by taking various bundles of fiber and twisting or braiding in a spiral direction to form a finished product.

Cabled/Seine Twines

Cotton

General purpose mason or chalk line. Government Spec. Available. Also available with Mildew Treatment, Waxed, Dyed and Colors. Pkg: 1/8 lb. Balls - 5 lb. Tubes

Nylon or Polyester

Seine Twine - Twisted or Braided. General purpose mason or chalk line. Colors and braided available. Pkg: 1/4, 1/2, 1 or 5 lb. Tubes

| Tensile Size | Cotton Seine (CT) | | Nylon or Polyester (NY) (PE) | |
|--------------|-------------------|----------|------------------------------|-------------|
| | (ft/lb) | Strength | Approx. (ft/lb) | AV Strength |
| 6 | 2150 | 12 | 4000 | 50 |
| 9 | 1434 | 18 | 2211 | 80 |
| 12 | 1440 | 30 | 1940 | 100 |
| 15 | 1152 | 38 | 1595 | 126 |
| 18 | 960 | 45 | 1195 | 165 |
| 21 | 823 | 53 | 825 | 200 |
| 24 | 720 | 60 | 685 | 250 |
| 30 | 576 | 75 | 665 | 275 |
| 36 | 480 | 90 | 585 | 325 |
| 42 | 411 | 105 | 425 | 370 |
| 48 | 360 | 120 | 385 | 425 |
| 54 | - | - | 350 | 520 |
| 60 | 288 | 150 | 310 | 550 |
| 72 | 240 | 180 | 250 | 635 |
| 96 | 180 | 240 | - | - |
| 120 | - | - | - | - |



Cotton & Polyester

American Brand twine ideal for tying machines - 8's yarn. Put up on cones tubes or balls, or many end reels. (Up to 36 Ply Available.) Also available in colors. Waxed & Tarred. Pkg: 1/8 lb. Balls - 5 lb. Tubes

| Ply | Approx. (ft/lb) | AV Tensile Strength |
|-----|-----------------|---------------------|
| 3 | 6400 | 8 |
| 4 | 4800 | 10 |
| 6 | 3200 | 15 |
| 8 | 2400 | 20 |
| 10 | 1920 | 25 |
| 12 | 1600 | 30 |
| 16 | 1200 | 40 |
| 20 | 960 | 50 |
| 24 | 800 | 60 |
| 30 | 640 | 75 |
| 36 | 533 | 90 |



Polypropylene

Consistent in size and tensile strength. Foamed monofilament construction. Superior knot holding. Also Available in two and three-ply construction. Pkg: 10 lb. Cartons. Also available in Slit Film and colors.



| Size | AV Tensile Strength | Dia. (in.) |
|--------|---------------------|------------|
| 1200/1 | 100 | .078 |
| 1060/1 | 120 | .082 |
| 960/1 | 125 | .086 |
| 890/1 | 135 | .089 |
| 830/1 | 150 | .093 |
| 750/1 | 170 | .097 |
| 650/1 | 200 | .104 |
| 600/1 | 215 | .109 |
| 550/1 | 230 | .114 |
| 500/1 | 250 | .119 |
| 450/1 | 290 | .122 |
| 425/1 | 300 | .129 |
| 330/1 | 380 | .147 |
| 270/1 | 500 | .163 |

Polypropylene Twine

Bucket (Low Boy)

- Wire Pulling Twine
- Twisted film polypropylene
- Clear

| Size | Avg. Break (lbs) | Case Pack Wgt./Pack |
|---------------|------------------|---------------------|
| 2-Ply x 6500' | 200 | 40.00/4 |



Polypropylene Center Pull Box

- Wire Pulling Twine
- Twisted film polypropylene
- Clear

| Size | Avg. Break (lbs.) | Case Pack Wgt./Pack |
|---------------|-------------------|---------------------|
| 2-Ply x 6500' | 200 | 40.00/4 |

Ropes

CLIMBING ROPES

Tree Pro



A perfectly balanced climbing rope of high tenacity 100% polyester in a 12-strand construction. This distinctive red polyester rope is enhanced by a gold tracer. Each strand is treated with a special finish to minimize snagging, improve wear and give excellent knot control. TREE PRO offers high strength, low stretch, flexibility, is non-rotational, maintains its round shape in use - the perfect choice for the Professional Arborist.

| Size (in) | Wt. 100 (lbs) | Tensile (lbs) |
|-----------|---------------|---------------|
| 1/2 | 8.3 | 7,000 |

- Available in:
- 120' & 150' Coils
 - 600' Reels

Tree Perfect



The perfect climbing rope utilizing a 16-strand construction of 100% polyester cover and a 100% nylon core. The smooth rope surface has a special finish to assure snag resistance, minimize abrasion and improve the serviceability of the line. TREE PERFECT maintains its original round shape under load, is very flexible, non rotational and will not hockle.

| Size (in) | Wt. 100 (lbs) | Tensile (lbs) |
|-----------|---------------|---------------|
| 1/2 | 7.5 | 7,000 |

- Available in:
- 120' & 150' Coils
 - 600' Reels

Arbor Plus



A 12-strand climbing and bull rope, each yarn made of high tenacity polyester covering a polyolefin core. The rope is white with distinctive blue and gold polyester tracers. Designed with a firm lay and special finish, ARBOR PLUS is lightweight yet strong giving good resistance to abrasive wear when running through crotcher, over limbs and against bark while under load. ARBOR PLUS maintains its shape, has good knot control, is flexible, non-hocking and non-rotational.

| Size (in) | Wt. 100 (lbs) | Tensile (lbs) |
|-----------|---------------|---------------|
| 1/2 | 7.2 | 5,500 |
| 5/8 | 12.2 | 10,000 |
| 3/4 | 16.5 | 13,000 |

- Available in:
- 120' & 150' Coils
 - 600' Reels

E-Z-V



The same 16-strand properties, operational control and safety of TREE PERFECT with an alternating pattern of high visibility fluorescent and with strands throughout the rope. The professionals choice in high visibility ropes.

| Size (in) | Wt. 100 (lbs) | Tensile (lbs) |
|-----------|---------------|---------------|
| 1/2 | 8.0 | 6,000 |

- Available in:
- 120' & 150' Coils
 - 600' Reels

Maximum-V



The ultimate high visibility rope, with alternating orange and yellow fluorescent strands. Its 16-strand construction, quality and performance are identical to TREE PERFECT and E-Z-V. MAXIMUM-V truly sets the standard in high visibility climbing ropes.

| Size (in) | Wt. 100 (lbs) | Tensile (lbs) |
|-----------|---------------|---------------|
| 1/2 | 8.5 | 5,500 |

- Available in:
- 120' & 150' Coils
 - 600' Reels

BLUE WATER NYLON RESCUE ROPES

Blue Water + Plus Ropes

The original static kernmantle safety and rescue ropes. Permanent solution dyed color with fluorescent color marker stripe. 100% nylon. Superior flexibility and knotability. Four times more resistant to abrasion than competing kernmantle ropes. Unique double-twisted cable core construction gives superior resistance to abrasion. Designed with load absorption capabilities to provide additional safety in the event a shock-force is applied to the line. High Strength - Low Stretch - No Spin.

| Size (in) | Min. Tensile Strength | Working Load Elongation | Load Absorption Capacity | Ft. per Lb. |
|-----------|-----------------------|-------------------------|--------------------------|-------------|
| 3/8 | 5,500 | 2.0% | 1,325 | 21 |
| 7/16 | 6,500 | 1.6% | 1,450 | 19 |
| 1/2 | 9,100 | 1.5% | 1,600 | 14 |
| 5/8 | 13,000 | 1.2% | 2,300 | 11 |

Superline + Plus™

Orange with Fluorescent Yellow Stripe

- 3/8" Dia.* Tag Line/Emergency Escape
- 7/16" Dia.* Rappelling/Rigging
- 1/2" Dia.** Lifeline, Hauling Line
- 5/8" Dia.** Lifeline, Hauling Line



Blueline + Plus™

Blue with Fluorescent Yellow Stripe

- 3/8" Dia.* Tag Line/Emergency Escape
- 7/16" Dia.* Rappelling/Rigging
- 1/2" Dia.** Lifeline, Hauling Line
- 5/8" Dia.** Lifeline, Hauling Line

** NFPA 1983/1995 ad. 2 Person Rope
* NFPA 1983/1995 ad. 1 Person Rope.

SPECIALTY PRODUCTS

These products and accessories are designed for specific markets or applications.

Wire Center Cord

- Puritan™ Brand
- Cotton solid braid jacket
- Galvanized Wire Center
- Color: Natural or Mahogany

| Nominal Dia. (in) | Approx. Yield (in) | Approx. Tensile (ft./lb) | RWL (lbs) |
|-------------------|--------------------|--------------------------|-----------|
| 3/16 | 49.1 | 300 | 45 |
| 1/4 | 39.1 | 370 | 55 |
| 5/16 | 29.5 | 675 | 100 |
| 3/8 | 13.9 | 900 | 135 |

Conduit Measuring Tape

- Waterproof
- Polyester construction
- Foot measurements printed every foot from 0 to 3,000 ft.

| Length (ft) | Min. Break | Case Pack Wgt./Pack |
|-------------|------------|---------------------|
| 3000 | 130 | 13.52/4 |

Shock Cord

High quality rubber core with Cotton, Nylon, Polyester or Polypropylene single or double cover jacket. Colors and Military Specifications available. General purpose and Cargo Tie Down. Sizes up to 1" dia.

- Cotton - CT
- Polyester - PE
- Nylon - NY
- Polypropylene - MF



| Dia. | Std. Spool Lengths (ft) | Approx. Spool Weight (lbs) | AV Tensile Strength (lbs) |
|------|-------------------------|----------------------------|---------------------------|
| 1/8 | 500 | 5 | 125 |
| 3/16 | 500 | 6 | 200 |
| 1/4 | 500 | 10 | 275 |
| 5/16 | 300 | 11 | 325 |
| 3/8 | 200 | 11 | 375 |
| 1/2 | 150 | 10 | 450 |

Cordage

Ropes

CARRIER ROPES

**Paper Carrier Ropes -
 AES-Samson Designed**

Each Samson-AES carrier rope is engineered to satisfy all your dryer sections varying production demands based on speed, temperature, number of dryers, and size press versus no size press. Samson-AES carrier ropes are made using a combination of the finest filament nylon, filament polyester and spun nylon fibres employing a patented Parallay™ construction that orients all the fibres parallel to the rope axis. This exclusive design produces a highly reliable and dimensionally stable rope that has excellent paper grip. Unlike 3-strand twisted ropes that concentrate wear on narrow crowns, Samson-AES ropes provide a maximum bearing, torque free surface which will not backturn, but will run free, to reduce abrading forces and extend wear life.



| | Rope | Dia. (in) | Description | Wt. per 100 ft. (lbs) | Tensile (lbs) | % Elastic Elongation at 300 # Load |
|---------------|--------------------------|-----------|--|-----------------------|---------------|------------------------------------|
| Coreless Type | NCR-32 | 3/8 | Gold filament nylon/white spun polyester | 3.3 | 3,350 | 5.1 |
| | NCR-32 | 1/2 | Gold filament nylon/white spun polyester | 6.7 | 7,450 | 3.0 |
| | FCR-33 | 3/8 | Gold filament nylon/white filament polyester | 3.8 | 4,200 | 3.2 |
| | FCR-33 | 1/2 | Gold filament nylon/white filament polyester | 7.6 | 8,725 | 1.8 |
| | PCR-34 | 3/8 | White filament polyester/white, spun nylon | 3.6 | 3,550 | 3.4 |
| | PCR-34 | 1/2 | White filament polyester/white spun nylon | 7.3 | 7,000 | 2.2 |
| | PCR-34C | 3/8 | White filament polyester/white spun nylon with Samthane coating | 3.7 | 3,550 | 3.3 |
| | PCR-34C | 1/2 | White filament polyester/white spun nylon with Samthane coating | 7.5 | 7,000 | 1.6 |
| | Superlife | 3/8 | Filament polyester coated yarns heat tension set | 4.2 | 5,600 | 2.2 |
| | Superlife | 1/2 | Filament polyester coated yarns heat tension set | 8.3 | 9,540 | 2.0 |
| Core Type | Superlife with Core | 3/8 | Same as above with braided core treated with Samthane coating | 5.5 | 5,460 | 2.0 |
| | Superlife with Core | 1/2 | Same as above with braided core treated with Samthane coating | 9.6 | 9,360 | 1.9 |
| | Superlife with Core | 1/2 | Same as above with braided core treated with Samthane coating | 9.6 | 9,360 | 1.9 |
| | Super Traction with Core | 3/8 | White filament polyester and goldspun nylon. Core treated with Samthane coating. | 5.9 | 5,460 | 2.0 |
| | Super Traction with Core | 1/2 | White filament polyester and goldspun nylon. Core treated with Samthane coating. | 9.0 | 10,550 | 1.6 |

Treatments:

Samthane coatings are a family of urethanes impregnated throughout the rope. First developed for severe marine conditions and now proven in almost every aspect of rope use, these coatings will improve abrasion resistance, lower stretch and prolong rope wear life. Ropes are available in four colors, white, yellow, orange, and green.

Superlife is a premium quality rope with individual rope filaments treated with our special Samthane Type Z. The unique process of coating an heat setting the fibre filaments, provides a superior run life. Available in orange, red and blue.

Our unique "in house" coating is designed to extend the life of synthetic fibers.

