All About Cordage

CORDAGE SIZES Acceptable tolerance limits: Cords 1/8 inch diameter and smaller ± .0050. Cords larger than 1/8 inch diameter ± .1056

Size No.*	NOMINAL DIAMETER (In.)	(Decimal)	(mm)	NOMINAL CIRCUMFERENCE (In.)	Decimal)	(mm)
2	1/16	.063	1.59	3/16	.188	4.76
2-1/2	5/64	.078	1.98	1/4	.250	6.35
3	3/32	.094	2.38	5/16	.313	7.94
3-1/2	7/64	.109	2.78	11/32	.344	8.73
4	1/8	.125	3.17	3/8	.375	9.53
4-1/2	9/64	.141	3.57	7/16	.438	11.11
5	5/32	.156	3.97	1/2	.500	12.70
5-1/2	11/64	.172	4.37	17/32	.531	13.50
6	3/16	.188	4.76	5/8	.625	15.88
7	7/32	.219	5.56	11/16	.688	17.46
8	1/4	.250	6.35	3/4	.750	19.05
9	9/32	.281	7.14	7/8	.875	22.23
10	5/16	.313	7.94	1	1.000	25.40
12	3/8	.375	9.53	1-1/8	1.125	28.58
14	7/16	.438	11.11	1-1/4	1.250	31.75
16	1/2	.500	12.70	1-1/2	1.500	38.10
18	9/16	.563	14.29	1-3/4	1.750	44.45
20	5/8	.625	15.88	2	2.000	50.80
24	3/4	.750	19.05	2-3/8	2.375	60.34
28	7/8	.875	22.23	2-3/4	2.750	69.85
32	1	1.000	25.40	3	3.000	76.20
36	1-1/8	1.125	28.58	3-1/2	3.500	88.90
40	1-1/4	1.250	31.75	3-3/4	3.750	95.25
42	1-5/16	1.313	33.34	4	4.000	101.60 (10.16 cm)
48	1-1/2	1.500	38.10	4-1/2	4.500	114.30 (11.43 cm)
52	1-5/8	1.625	41.28	5	5.000	127.00 (12.70 cm)
56	1-3/4	1.750	44.45	5-1/2	5.500	139.70 (13.97 cm)
64	2	2.000	50.80	6	6.000	152.40 (15.24 cm)
68	2-1/8	2.125	53.98	6-1/2	6.500	165.10 (16.51 cm)
72	2-1/4	2.250	57.15	7	7.000	177.80 (17.78 cm)
80	2-1/2	2.500	63.50	7-1/2	7.500	190.50 (19.05 cm)
84	2-5/8	2.625	66.68	8	8.000	203.20 (20.32 cm)
92	2-7/8	2.875	73.03	8-1/2	8.500	215.90 (21.59 cm)
96	3	3.000	76.20	9	9.000	228.60 (22.86 cm)

*Generally used only for braided cordage.

PROPER USE AND CARE OF CORDAGE

AVOID OVERLOADING . . . The lower limit of the working load range should be used where life or limb is involved or for exceptional service conditions such as shock loads, sustained loads, etc. You should never exceed the listed working load range except as indicated above. If you rope is old or worn, you should make additional allowances to assure safety.

AVOID ABRASION . . . Out and inner rope fibers contribute equally to the strength of your rope. When worn, your rope is naturally weakened. Where it is necessary for a rope to rub over an object protect with chafing gear, such as canvass wrapped and tied around the rope.

AVOID SUDDEN STRAIN . . . Rope that is strong enough under a steady strain can be broken with a sudden jerk. Care when working with rope is extremely important.

AVOID KINKS . . . When rope is repeatedly turned or twisted in one direction, it is certain that kinks will develop, unless twists are repeatedly thrown in, or out of the rope. Pulling a kink through a restricted space such as a tackle block will seriously damage the rope fibers.

AVOID SHARP ANGLES . . . Sharp bends greatly affect the strength of a rope. Any sharp angle is a weak spot. Pad is for safety, and even then, Be Careful!

Continued on the next page

All About Cordage

REVERSE ENDS . . . Prolonged use, or wear, of one part of a rope will naturally decrease its effectiveness at that point. Occasionally reverse your rope, end-for-end, to distribute the wear more evenly. A good example is an anchor line aboard a boat.

AVOID CHEMICALS . . . Virtually all synthetic fiber ropes are resistant to damage from oil, gasoline, paint and most chemicals. To be on the safe side, however, keep your rope free of any type chemical. Natural fiber ropes are, of course, severely damaged by exposure to chemicals.

KEEP ROPE CLEAN . . . Dirt on the surface and imbedded in rope acts as an abrasive on fibers. When rope becomes dirty wash it thoroughly with clean water. Be sure to dry natural fiber ropes before storing.

AVOID IMPROPER STORAGE . . . Synthetic fiber ropes require no special storing conditions other than keeping them out of direct sunlight, away from the elements and out of extremely hot rooms. The ultra-violet rays of sunlight has a weakening effect on rope that is exposed for prolonged periods of time. Natural fiber ropes must of course, be kept dry or they will rot in a very short time.

CORDAGE SPECIFICATIONS

NEW ROPE TENSILE STRENGTHS are based on tests of new and unused rope of standard construction in accordance with Cordage Institute Standard Test Methods. All figures are "Average" - The Minimum is 10% below stated amount. WORKING LOAD LIMIT is indicated by RECOMMENDED WORKING LOAD RANGES. USE OF WORKING LOADS—Because of the wide range of rope use, rope condition, exposure to the several factors affecting rope behavior, and the degree of risk to life and property involved, it is impossible to make blanket recommendations as to working loads. However, to provide guidelines, working loads are tabulated for rope in good condition with appropriate splices, in noncritical applications and under normal service conditions. WORKING LOAD RANGES should be exceeded only with expert knowledge of conditions and professional estimates of risks.

The RECOMMENDED WORKING LOAD RANGES are derived by taking 15 - 25% of NEW ROPE TENSILE STRENGTH for Braided Rope and 10 - 20% for Twisted Rope.

SYNTHETIC CORDAGE

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 fibered 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 used in the manufacturing of rope and listed 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: Due to its elasticity, nylon can absorb sudden shock loads that would break ropes of other fiber. 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 ultra-violet degradation from sunlight. Other than this, the characteristics of the two fibers are practically the same.

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

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

SYNTHETIC FIBER TYPES

MULTIFILAMENT: Soft, flexible, fine diameter, continuous strands. Available in nylon, polyester and polypropylene ropes only.

MONOFILAMENT: Extruded in round fibers. Not as soft 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

Continued on the next page

All About Cordage

are twisted into string then into rope. Available in cotton and polyester ropes only.

TEXTURIZED: Fibers are kinked to give loft to the fiber. Available in polyester, nylon and polypropylene.

COLOR: Natural color, in synthetic cordage, means white or silvery white obtained through the use of dyes and pigments.

COTTON CORDAGE

The primary advantages of cotton twines, sash cords, shade cords and rope are its good handling characteristics and knot holding ability. Cotton cordage is especially suited to specific uses, however, it does not have the strength or durability of the synthetic fibers.

ROPE CONSTRUCTIONS

TWISTED (LAID): Size for size, and pound for pound, twisted rope is the strongest and least expensive rope manufactured today. It is normally manufactured by twisting three strands, or bundles, of fibers in a spiral direction. It is spliceable.

SOLID BRAID: constructed with 9, 12 or 18 strands of fiber lock-stitched together. Has a very smooth surface with a firm, round cross-section that holds its shape under pressure and load. Excellent for use in pulleys, on winches, or anywhere that a firm, round rope is needed. It is not spliceable.

MAYPOLE BRAID: Constructed with 8, 12 or 16 strands of fibers tightly braided around a center core of parallel fibers. It is generally not as round as solid braid, but tends to have a greater breaking strength. The strands form a herringbone patten in the rope. It is not spliceable.

DIAMOND BRAID: Constructed with 8, 12 or 16 strands of fibers braided over and under each other in a circular direction. The center of the rope is hollow, allowing for easy splicing. Generally stronger than solid braid or maypole braid constructions. Easily and quickly spliced.

BRAID-ON-BRAID: Actually two ropes in one, with a jacket braided over a braided rope core. A very strong and flexible rope that doesn't kink, hockle or rotate under load. It is spliceable.

DEFINITIONS

BONDING: A coating of liquid 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.

PHYSICAL PROPERTIES OF FIBERS

Fiber Type	Specific Gravity	Sticking Temperature °F	Sticking Temperature °C	Melting Temperature °F	Melting Temperature °C	Ultimate Elongation %
Nylon	1.34	455	235	482	250	25-35
Polyester	1.38	455	235	500	235	15-25
Polypropylene	.90	302	150	330	165	20-25
Polyethylene	.95	248	120	275	135	15-25
Cotton	1.54	–	–	Decomposes at 302	150	15-20

***SPECIAL NOTICE CONCERNING POLYPROPYLENE & POLYETHYLENE**: Polypropylene and Polyethylene are subject to deterioration when exposed to direct sunlight. These products were 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.