

YALE CORDAGE

Performance. Passion. Possibilities.

SYNTHETIC CABLE & ROPE TECHNOLOGY



- Single Braid
- Double Braid
- Parallel Core
- Plaited 8-Strand
- Slings
- Rope Tools & Coatings

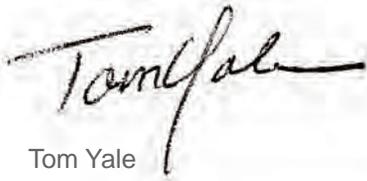
INDUSTRIAL
SECOND EDITION

From Our Owner

Yale Synthetic Cable & Rope Technology has never lost a customer to a competitor based on quality, nor have we sought customers on the basis of price alone. We have always embraced new fiber technologies and have been the first manufacturer to incorporate them in rope and cable products when they provide the best value to the customer.

Yale has continuously developed unique custom and modified machinery to maintain its advantage in processing fibers to their fullest potential.

We do this every day to the very best of our abilities in Maine and North Carolina ... nowhere else.



Tom Yale



Contents by Construction

Plaited 8-Strand

Oceanographer's Brait	4
Nylon Brait	5
Large Braits	6
Unitrex XS-8	7
Hy-Dee Brait	8
Shark Byte 8	9

Single Braid

Shark Byte 12	9
Ultrex	10
Cat's Eye Ultrex	11
SP-12	12
Maxibraid	13
Vectrus	14
Aracom 100	15
Yalex	16
Optimus	17
PE-12	18
Pilot Line	18

Phantom-12	19
PolyPlus Braid	20
Lugger Line	21

Double Braid

Crystalyne	22
Mega Max	23
Ultrex Plus	24
Maxibraid Plus	25
Aracom T	26
Aracom Miniline	27
Double Esterlon	28
Portland Braid	29
Polydyne	30
Yalon	31
Kernmaster	32
Tech-Kern	33

Parallel Core

Uniline	34
Unitrex	35

Slings and Rope Tools

Fortis ² Heavy-Lift Slings	36
LOUPS	38
ZipGrip	40
YaleGrip	41
Eye/Eye & Endless Slings	42
Adjustable Single/ 4-Leg Slings	43
Optimus Double Adjustable Transformer Slings	44
Boat Slings	45
TechEye & TechJoin	46
Synthetic Shackle	47
Tandem Stopper Assembly	47
Yale Coat/Cordura Chafe	48
Maxijacket Coatings	49
Splicing & Labeling	50
Index of Engineering	51
Usage	52
Inspection	54

The construction design and materials are subject to change without notice.



3-Strand

The simplest type of rope is formed by twisting fiber into a strand, and then twisting three strands into rope. Its conversion efficiency is relatively low since this construction technique is the hardest on fiber.



Plaited Rope

Eight-strand "Square Braid" is comprised of eight individual strands, which are woven together as four pairs. Its major advantages are nonrotation and high energy absorption.



Single Braid

This construction leaves a void in the center and utilizes strand counts of 8, 12 or 16. The hollow is instrumental in making it easy to splice. Hollow braids are nonrotating and are an extremely efficient way to utilize fiber.



Double Braid

This is really two separate ropes in one: the core, which is a single braid, is overbraided with a sleeve. This construction allows the rope to be used for more applications; the same or dissimilar fibers can be engineered into a rope suited for many specific applications. This construction entirely shields one of the two elements in the rope from abrasion.



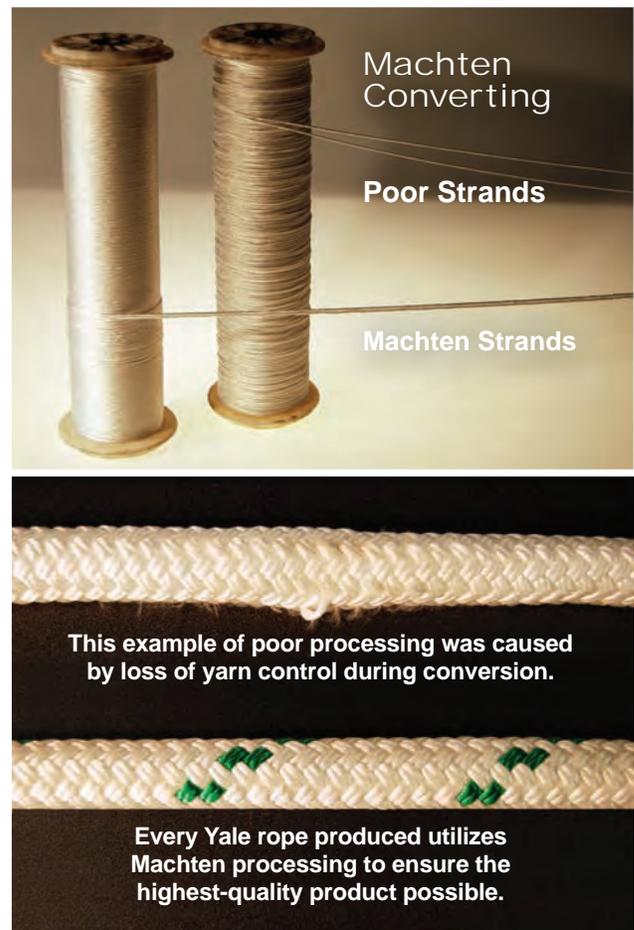
Parallel Core

This construction consists of a core of parallel yarns that are held together by a wide variety of different means from extrusion to braiding. Due to their low twist level, these linear cables achieve the highest fiber-strength efficiency.

Yale's major objective in manufacturing ropes is to effectively convert high-tenacity yarns into finished braided ropes. Yale maintains an aggressive quality assurance program that covers every aspect of production, from the inspection of incoming yarn, machine setups, random inspections during processing and final testing of the finished product.

Certainly one key element in efficiently converting filament into rope is careful control of yarn tension in every stage of production. It is of little use to buy high-grade fiber without making the commitment to high converting standards. Strands braided at different tensions or with varying twist levels do not work together equally in the finished product, causing weak ropes that wear out quickly since a small percentage of the rope's fibers are always forced to work harder than they should.

Yale's exclusive Machten processing ensures the yarn is always tensioned and under control, from the time the yarn is removed from the supplier's package until it is a completed product. The result is a finished rope that has aesthetic perfection and exemplary performance. The photographs show examples of good and bad processing.



Oceanographer's Brait



Oceanographer's Brait

Oceanographer's Brait is the most predictable nylon rope you can buy. Yale begins this process by **1** utilizing nylon 6, which has a much higher energy-absorption capability than nylon 6-6. This can mean the difference between a mooring that stays on station or is lost. **2** The fiber is twisted to add firmness, **3** twisted again to add additional energy absorption, and **4** then ply twisted as we close the strand using a counter-twisted veneering yarn creating a better-balanced strand. All of this makes a rope that is firm enough to be used over a less-than-perfect deck. **5** Yale then plaits the eight strands loosely enough to accommodate a shrink process that further enhances the product. **6** Steam stabilizes the rope

over an eight-hour period so the shrinkage and strength reduction you have had to deal with in the past is eliminated. Although this firms the rope even more, there is no subsequent shrinkage so the rope splices just as easily after use as it did the day you deployed it. **7** If you elect to have your rope stretched over our automated equipment, you can eliminate the guesswork of what the permanent non-recoverable elongation component of your rope will be after you deploy your mooring. The curves below show the difference this step can offer. This process will also increase your rope's length 4-8% permanently.



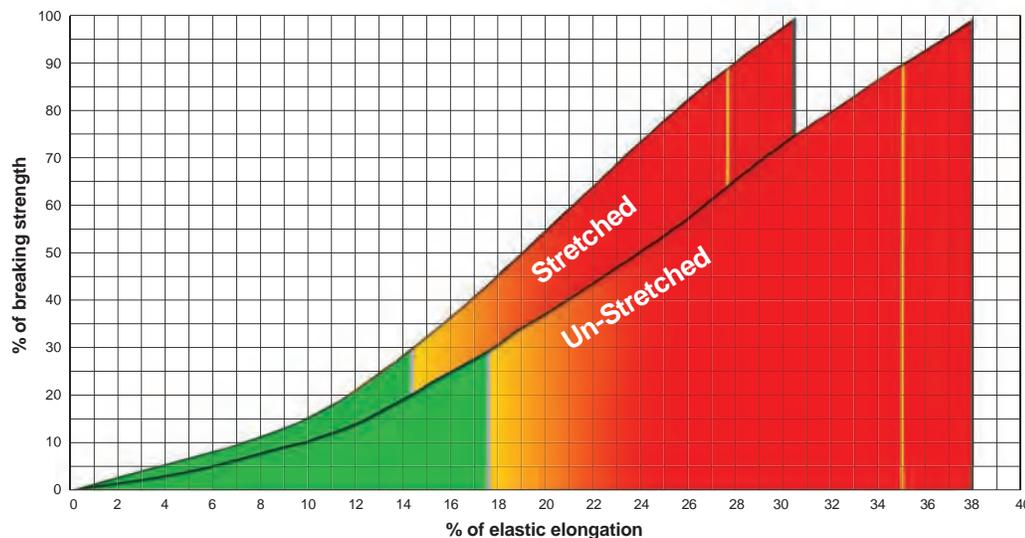
Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 3:1		Weight		Average Energy Absorption***
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m	ft lbs/100ft
11/16	(17)	15,000	6,810	13,500	6,129	4,500	1,839	10.5	15.6	24,150
3/4	(19)	17,820	8,090	16,038	7,281	5,347	2,185	13.4	19.9	30,820
7/8	(22)	24,200	10,985	21,780	9,887	7,261	2,966	18.5	27.5	42,550
1	(25)	29,700	13,480	26,730	12,132	8,911	3,640	23.7	35.3	54,510
1-1/8	(29)	37,510	17,025	33,759	15,323	11,254	4,597	28.0	41.7	64,400
1-1/4	(32)	46,420	21,070	41,778	18,963	13,927	5,689	34.0	50.6	78,200

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** 33% of break strength. Your application may dictate a different maximum working load.

*** At working load for non-stretched.



Energy Absorption
The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

■ Green working 2,739 ft. lbs./lb.
■ Red ultimate 26,074 ft. lbs./lb.

Approved Splice Technique:
#10017302.

— Maximum Working Load
— Minimum Break Strength
— Average Break Strength

Specific Gravity: 1.14



Nylon Brait

Nylon Brait combines braiding technology with plaited rope optimizing the best of both rope styles. Nylon Brait's most outstanding feature is its high energy absorption, which comes from a combination of the very long yarn path and stranditure developed especially to maximize energy absorption. Nylon Brait can absorb

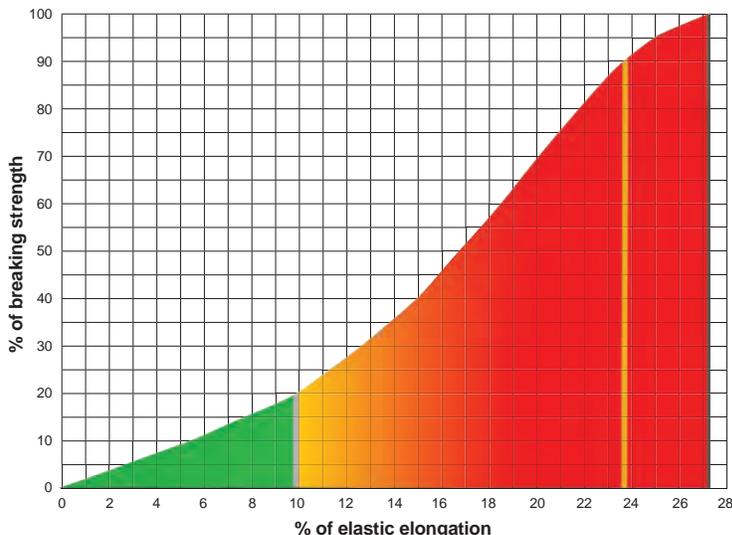
(or mitigate) greater amounts of dynamic energy than 3-stranded or braided-rope structures with less damage. Brait's energy absorption also keeps the corresponding loads on attachment points smaller since the rope does more work internally. Brait is easily spliced and the spliced rope delivers 100% of the rope's advertised strength.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
3/8	(10)	4,000	1,800	3,600	1,620	800	360	3.8	5.7
1/2	(13)	8,300	3,750	7,470	3,375	1,660	750	6.1	9.1
17/32	(13)	9,200	4,150	8,280	3,735	1,840	830	6.4	9.6
5/8	(16)	12,200	5,500	10,980	4,950	2,440	1,100	9.4	14.0
21/32	(17)	12,900	5,850	11,610	5,265	2,580	1,170	9.6	14.3
11/16	(17)	15,000	6,800	13,500	6,120	3,000	1,360	11.0	16.4
3/4	(19)	17,000	7,700	15,300	6,930	3,400	1,540	14.0	20.8
7/8	(22)	22,000	10,000	19,800	9,000	4,400	2,000	19.0	28.3
1	(25)	27,000	12,250	24,300	11,025	5,400	2,450	23.7	35.3
1-1/8	(29)	34,750	15,750	31,275	14,175	6,950	3,150	30.5	45.4
1-1/4	(32)	40,500	18,350	36,450	16,515	8,100	3,670	35.6	53.0
1-1/2	(38)	56,700	25,700	51,030	23,130	11,340	5,140	49.8	74.2
1-5/8	(41)	67,700	30,700	60,930	27,630	13,540	6,140	59.5	88.6
1-3/4	(44)	84,700	38,450	76,230	34,605	16,940	7,690	74.0	110.2

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load up or down, in excess of 10% of the rope's rated working load constitutes hazardous shock load and would void normal working load recommendation. Consult Yale Cordage for guidelines for working loads and safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 1,426 ft. lbs./lb.
- Red ultimate 23,680 ft. lbs./lb..

Approved Splice Technique: #10017302.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.14

Large Braits



Large Braits

Yale is pleased to announce its acquisition and installation of equipment necessary to produce large-diameter plaited ropes. Our capability in these styles of ropes, widely accepted in smaller diameters, now continues through 5" diameter, or 15" circumference. This page provides our preliminary data for these styles of ropes. The first, Nylon Brait, in sizes 6" through 15" circumference, is based on Nylon 6-6 and is a four-stage rope, laid firm and easily spliced.

The second, Polyester Brait, is also a 4-stage rope based on PET high-tenacity yarn, offering exceptional tension fatigue, especially wet. The third rope is a plaited Ultra High Molecular Weight Polyethylene. UHMWPE is one of the strongest fibers known and is very low elongating. The geometry of the plaited UHMWPE fiber allows more substantial dynamic loads to be imparted on the rope without compromising its longevity.

Specifications

Larger Nylon Brait	Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
	Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
	2	(51)	101,000	45,850	90,900	41,265	20,200	9,170	100	149
2-1/4	(57)	136,000	61,740	122,400	55,566	27,200	12,348	132	197	
2-5/8	(67)	173,000	78,540	155,700	70,686	34,600	15,708	170	253	
3	(76)	215,000	97,610	193,500	87,849	43,000	19,522	220	328	
3-1/4	(83)	271,000	123,030	243,900	110,727	54,200	24,606	282	420	
4	(102)	383,000	173,880	344,700	156,492	76,600	34,776	402	599	
5	(127)	603,000	273,760	542,700	246,384	120,600	54,752	604	899	

Larger Polyester Brait	Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
	Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
	2	(51)	101,000	45,850	90,900	41,265	20,200	9,170	121	180
2-1/4	(57)	136,000	61,740	122,400	55,566	27,200	12,348	160	238	
2-5/8	(67)	173,000	78,540	155,700	70,686	34,600	15,708	206	307	
3	(76)	215,000	97,610	193,500	87,849	43,000	19,522	266	396	
3-1/4	(83)	271,000	123,030	243,900	110,727	54,200	24,606	341	508	
4	(102)	383,000	173,880	344,700	156,492	76,600	34,776	486	724	
5	(127)	603,000	273,760	542,700	246,384	120,600	54,752	731	1,089	

Larger UHMWPE Brait	Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
	Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
	2	(51)	339,000	153,905	305,100	138,515	67,800	30,781	75	112
2-1/4	(57)	480,000	217,920	432,000	196,128	96,000	43,584	101	150	
2-5/8	(67)	627,000	284,655	564,300	256,190	125,400	56,931	146	217	
3-1/8	(79)	768,000	348,670	691,200	313,803	153,600	69,734	176	262	
3-1/2	(89)	950,000	431,300	855,000	388,170	190,000	86,260	250	372	
4	(102)	1,200,000	544,800	1,080,000	490,320	240,000	108,960	346	515	

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Unitrex XS-8

Unitrex XS-8 consists of eight (8) Unitrex ropes plied together to form an 8-strand plaited cable. Very strong, very light and very abrasion resistant, Unitrex XS-8 is unique. The base cable, Unitrex, is made of parallel strands of Ultra High Molecular Weight Polyethylene UHMWPE fiber, bonded together with a rubberized adhesive, wound

with rubber tape and then over-braided with a polyester jacket, which is saturated with urethane. The subsequent oven curing fuses the tape, making a very tough cable or in this case, strands to make an even larger strength member. Unitrex XS-8 is easily spliced with a straightforward tucking procedure.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 4:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1-1/2	(38)	136,000	61,740	122,400	55,566	34,000	15,435	52	77
1-3/4	(44)	166,000	75,360	149,400	67,824	41,500	18,840	71	106
1-7/8	(48)	213,000	96,700	191,700	87,030	53,250	24,175	90	134
2-1/8	(54)	272,000	123,485	244,800	111,137	68,000	30,871	106	158
2-1/2	(64)	323,000	146,640	290,700	131,976	80,750	36,660	149	222
2-7/8	(73)	470,000	213,380	423,000	192,042	117,500	53,345	214	319
3-1/2	(89)	640,000	290,560	576,000	261,504	160,000	72,640	290	432
3-3/4	(95)	800,000	363,200	720,000	326,880	200,000	90,800	380	566
4-1/4	(108)	1,010,000	458,540	909,000	412,686	252,500	114,635	490	730
4-3/4	(121)	1,248,000	566,590	1,123,200	509,931	312,000	141,648	600	893

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.

Specific Gravity: 1.10



Hy-Dee Brait

Hy-Dee Brait is an 8-strand bi-polymer rope with extraordinary dielectric properties. The rope is nubby, which provides excellent grip, and treated with a proprietary chemical mixture Yale calls Aralube-dielectric.

This treatment is the key to Hy-Dee Brait's wet dielectric performance and allows us to make the highest dielectric-strength rope commercially available. It is easy to splice with a tucking procedure or by the quick-splice method.

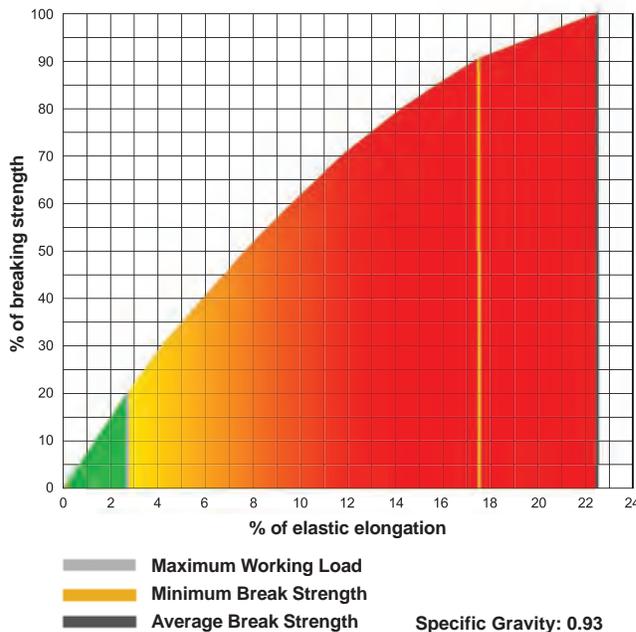
This product is 100% lot tested for dielectric conformance.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 8:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
3/8	(10)	3,200	1,450	2,880	1,305	400	180	3.3	4.9
1/2	(13)	5,600	2,540	5,040	2,286	700	315	5.6	8.3
9/16	(14)	6,300	2,860	5,670	2,574	788	355	6.4	9.5
5/8	(16)	7,800	3,540	7,020	3,186	975	440	8.0	11.9
3/4	(19)	10,500	4,765	9,450	4,289	1,313	595	11.2	16.7

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instant changes in load up or down in excess of 10% of the rope's rated working load constitutes hazardous shock load and would void normal working load recommendation. Consult Yale Cordage for guidelines for working loads and safe use of rope.



Dielectric Strength: Hy-Dee Brait complies to ASTM specification F1701-12 that calls for a maximum leakage of 250 micro-amperes at any time during the wet test. Electrodes are 1 foot apart, shielded and the test is conducted at 50KV-AC.

Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 116 ft. lbs./lb.
- Red ultimate 12,673 ft. lbs./lb.

Approved Splice Technique: #10018006, #10017302.



Shark Byte 12



Shark Byte 8

Shark Byte

Shark Byte 12 is a 12-strand single braid product where the individual strands are a composite of copolymer olefins mixed randomly with Vectran LCP (Liquid Crystal Polymer) fiber. This product is the first synthetic rope ever designed from the ground up to resist fish-bite damage. By spreading the high-modulus Vectran fiber over a larger-than-required cross-sectional area to achieve a given strength and mixing it with a “tough to cut” lower modulus fiber, greater resistance to bite damage can be achieved.

Shark Byte 12 has successfully and extensively replaced wire on DART buoys, making them more easily serviced. Most importantly, this product is very hard to cut through and is also very easy to splice, entirely torque free, neutrally buoyant and supple in even sub-zero temperatures. This is especially important when line is near sharks using their teeth. Typically the residual strength of an attacked rope is in excess of 40% of a new rope’s published strength.

Shark Byte 8 is an 8-plait construction that is a composite of copolymer olefins and polyester. It is made to match existing mooring line systems. This product was designed to have a higher specific gravity to ensure it would be a sinking rope, and also to be a less-expensive alternative to the Shark Byte 12 product.



Specifications

Shark Byte 8	Diameter		Average Break Strength*		Minimum Spliced Break Strength*		Ultimate Energy Absorption		Estimated Residual Strength**	Linear Density	
	Inches	(mm)	Lbs	Kg	Lbs	Kg	Ft-Lbs/100ft	Ft-Lbs/Lb	%	Lbs/100ft	Kg/100m
	1-1/8	(29)	29,772	13,504	26,795	12,154	271,652	10,364	51	26.2	39.0
1-1/4	(32)	32,300	14,651	29,070	13,186	281,000	10,369	56	27.1	40.3	

Specific Gravity: 1.14

Shark Byte 12	Diameter		Average Break Strength*		Minimum Spliced Break Strength*		Ultimate Energy Absorption		Estimated Residual Strength**	Linear Density	
	Inches	(mm)	Lbs	Kg	Lbs	Kg	Ft-Lbs/100ft	Ft-Lbs/Lb	%	Lbs/100ft	Kg/100m
	1/2	(13)	9,200	4,175	8,280	3,758	16,701	3,884	32	4.3	6.4
3/4	(19)	22,800	10,350	20,520	9,315	40,393	3,884	42	10.4	15.5	
1	(25)	42,000	19,065	37,800	17,159	75,738	3,884	50	19.5	29.0	
1-1/8	(29)	48,000	21,790	43,200	19,611	97,100	3,884	72	25.0	37.2	

Specific Gravity: 1.10

Shark Byte 12 is neutrally buoyant. The theoretical specific gravity of the combined fibers is greater than water, i.e. >1.0, interstitially trapped air may affect the actual value for buoyancy.

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** The estimated residual strength is from laboratory and tank bite tests and may not represent the effects during actual use.

Ultrax

Ultrax is a 12-strand single braid of Ultra High Molecular Weight Polyethylene UHMWPE fiber enhanced with Yale's Maxijacket High Performance coating, which supplies superior abrasion resistance. The braid angles and twist level of Ultrax are designed to optimize break strength and keep stretch low. UHMWPE is the most forgiving

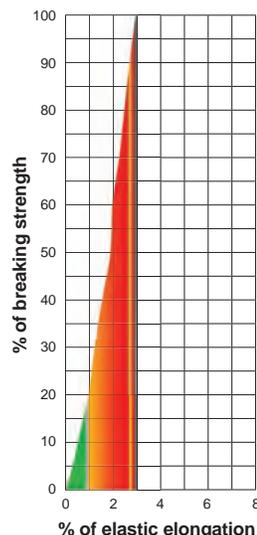
high-modulus fiber, giving better sheave-cycling capabilities than other high-tech fibers. Ultrax has zero water absorption and maintains its flexibility even in freezing conditions. As is the case for most Yale ropes, the strengths shown in the charts are for spliced ropes.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/16	(2)	800	360	720	324	160	72	0.1	0.2
1/8	(3)	2,200	995	1,980	896	440	199	0.3	0.5
5/32	(4)	3,400	1,540	3,060	1,386	680	308	0.5	0.7
3/16	(5)	6,000	2,720	5,400	2,448	1,200	544	1.0	1.5
1/4	(6)	10,000	4,540	9,000	4,086	2,000	908	1.7	2.5
5/16	(8)	13,500	6,125	12,150	5,513	2,700	1,225	2.4	3.6
3/8	(10)	20,000	9,080	18,000	8,172	4,000	1,816	3.5	5.2
7/16	(11)	25,700	11,665	23,130	10,499	5,140	2,333	4.6	6.8
1/2	(13)	37,400	16,975	33,660	15,278	7,480	3,395	6.2	9.2
9/16	(14)	45,000	20,430	40,500	18,387	9,000	4,086	7.5	11.2
5/8	(16)	53,000	24,060	47,700	21,654	10,600	4,812	9.0	13.4
3/4	(19)	75,000	34,050	67,500	30,645	15,000	6,810	12.2	18.2
7/8	(22)	98,000	44,490	88,200	40,041	19,600	8,898	17.6	26.2
1	(25)	120,000	54,480	108,000	49,032	24,000	10,896	21.2	31.6
1-1/8	(29)	148,000	67,190	133,200	60,471	29,600	13,438	28.7	42.7
1-1/4	(32)	172,000	78,085	154,800	70,277	34,400	15,617	36.1	53.8
1-5/16	(33)	184,000	83,535	165,600	75,182	36,800	16,707	41.8	62.2
1-1/2	(38)	230,000	104,420	207,000	93,978	46,000	20,884	57.0	84.9
1-5/8	(41)	285,000	129,390	256,500	116,451	57,000	25,878	65.0	96.8
1-3/4	(44)	330,000	149,820	297,000	134,838	66,000	29,964	78.0	116.2
2	(51)	390,000	177,060	351,000	159,354	78,000	35,412	92.0	137.0
2-1/8	(54)	430,000	195,220	387,000	175,698	86,000	39,044	103.5	154.1
2-1/4	(57)	480,000	217,920	432,000	196,128	96,000	43,584	115.0	171.2
2-1/2	(64)	530,000	240,620	477,000	216,558	106,000	48,124	139.0	207.0
2-5/8	(67)	598,000	271,490	538,200	244,341	119,600	54,298	158.0	235.3
2-3/4	(70)	660,000	299,640	594,000	269,676	132,000	59,928	177.0	263.6
3	(76)	760,000	345,040	684,000	310,536	152,000	69,008	203.0	302.3

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

■ Green working 318 ft. lbs./lb.

■ Red ultimate 8,300 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Ultrax is 75 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015109, #10018009.

■ Maximum Working Load
 ■ Minimum Break Strength
 ■ Average Break Strength

Specific Gravity: 0.97



Cat's Eye Ultrex

Cat's Eye Ultrex is a specially designed product for underground mining. This rope keeps the high strength of Ultrex and adds a reflective component to allow it to be seen in the conditions unique to underground mining. The Ultra High Molecular Weight Polyethylene UHMWPE fiber has been demonstrated to have better abrasion resistance, and Yale's special construction techniques maximize those characteristics.

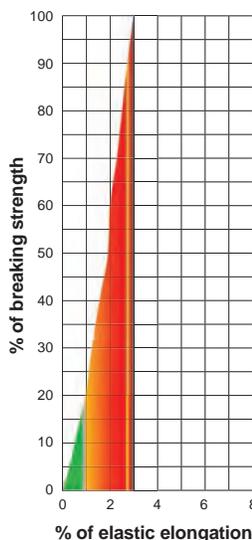
Ultrex is a 12-strand single braid of UHMWPE fiber enhanced with Yale's Maxijacket High Performance coating, supplying superior abrasion resistance. The braid angles and twist level of Ultrex are designed to optimize break strength and keep stretch low. UHMWPE is the most forgiving high-modulus fiber, giving better sheave-cycling capabilities than other high-tech fibers. As is the case for most Yale ropes, the strengths shown in the charts are for spliced ropes.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/2	(13)	37,400	16,975	33,660	15,278	7,480	3,395	6.2	9.2
9/16	(14)	45,000	20,430	40,500	18,387	9,000	4,086	7.5	11.2
5/8	(16)	53,000	24,060	47,700	21,654	10,600	4,812	9.0	13.4
3/4	(19)	75,000	34,050	67,500	30,645	15,000	6,810	12.2	18.2
7/8	(22)	98,000	44,490	88,200	40,041	19,600	8,898	17.6	26.2
1	(25)	120,000	54,480	108,000	49,032	24,000	10,896	21.2	31.6
1-1/8	(29)	148,000	67,190	133,200	60,471	29,600	13,438	28.7	42.7
1-1/4	(32)	172,000	78,085	154,800	70,277	34,400	15,617	36.1	53.8
1-5/16	(33)	184,000	83,535	165,600	75,182	36,800	16,707	41.8	62.2
1-1/2	(38)	230,000	104,420	207,000	93,978	46,000	20,884	57.0	84.9
1-5/8	(41)	285,000	129,390	256,500	116,451	57,000	25,878	65.0	96.8
1-3/4	(44)	330,000	149,820	297,000	134,838	66,000	29,964	78.0	116.2
2	(51)	390,000	177,060	351,000	159,354	78,000	35,412	92.0	137.0

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 318 ft. lbs./lb.
- Red ultimate 8,300 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Ultrex is 75 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test". Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015109, #10018009.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 0.97



SP-12

SP-12 is a 12-strand blended rope comprised of Ultra High Molecular Weight Polyethylene UHMWPE and polyester fiber. This rope is designed to take advantage of the high-strength and low-elongation properties of UHMWPE fibers, while providing a slightly lower price point than 100% UHMWPE ropes. The primary market opportunity is for long length conductor pulling machinery.

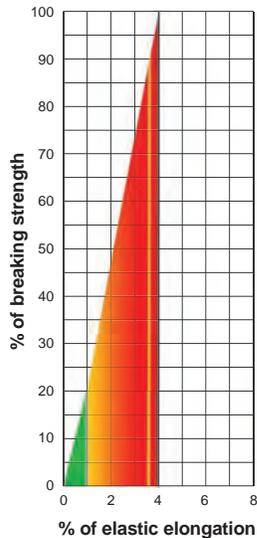
This rope can also be used in any application where 100% UHMWPE does not fit the need and 100% polyester is limited in selection as well. The rope is available in any of our Maxijacket High Performance colors which will be supplied as a standard coating. This product is identified by the addition of blue polyester fiber in the strand bundle of yarn.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
3/8	(10)	10,500	4,765	9,450	4,289	2,100	953	3.7	5.5
1/2	(13)	15,700	7,125	14,130	6,413	3,140	1,425	7.8	11.6
5/8	(16)	25,125	11,405	22,613	10,265	5,025	2,281	10.7	15.9
3/4	(19)	48,100	21,835	43,290	19,652	9,620	4,367	16.2	24.1
7/8	(22)	72,200	32,775	64,980	29,498	14,440	6,555	22.8	34.0

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

■ Green working 292 ft. lbs./lb.

■ Red ultimate 5,851 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry SP-12 is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

■ Maximum Working Load

■ Minimum Break Strength

■ Average Break Strength

Specific Gravity: 1.12

Maxibraid

Maxibraid is a 12-strand single-braid rope constructed from Ultra High Molecular Weight Polyethylene UHMWPE fiber. UHMWPE has the highest strength-to weight ratio of any synthetic or natural fiber, and it floats. The integral Maxijacket High Performance coating firms the construction, increases wear life and helps keep contaminants out of the rope. Maxibraid also has extremely low stretch and is laid firmer than Ultrex, sacrificing

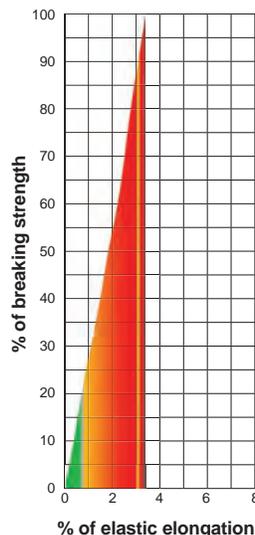
some tensile strength for longevity in tough field conditions. In many instances, we have found this firmer lay retains higher percentages of original breaking strength after use in the field for extended periods. Available in a variety of Maxijacket colors, which can help identify time in service, differentiate one rope from another or denote load ratings.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/8	(3)	1,800	815	1,620	734	360	163	0.4	0.6
5/32	(4)	2,700	1,225	2,430	1,103	540	245	0.7	1.0
3/16	(5)	4,300	1,950	3,870	1,755	860	390	1.0	1.5
1/4	(6)	6,600	2,995	5,940	2,696	1,320	599	1.5	2.2
5/16	(8)	9,800	4,445	8,820	4,001	1,960	889	2.4	3.6
3/8	(10)	14,300	6,490	12,870	5,841	2,860	1,298	3.5	5.2
7/16	(11)	18,000	8,170	16,200	7,353	3,600	1,634	4.0	6.0
1/2	(13)	26,500	12,030	23,850	10,827	5,300	2,406	6.5	9.7
9/16	(14)	32,000	14,525	28,800	13,073	6,400	2,905	7.5	11.2
5/8	(16)	39,500	17,930	35,550	16,137	7,900	3,586	9.2	13.7
3/4	(19)	49,000	22,245	44,100	20,021	9,800	4,449	12.7	18.9
7/8	(22)	69,000	31,325	62,100	28,193	13,800	6,265	17.2	25.6
1	(25)	82,000	37,225	73,800	33,503	16,400	7,445	21.0	31.3
1-1/8	(29)	108,000	49,030	97,200	44,127	21,600	9,806	26.5	39.5
1-1/4	(32)	120,000	54,480	108,000	49,032	24,000	10,896	34.7	51.7
1-5/16	(33)	130,000	59,020	117,000	53,118	26,000	11,804	39.5	58.8
1-1/2	(38)	156,000	70,820	140,400	63,738	31,200	14,164	45.5	67.8
1-3/4	(44)	230,000	104,420	207,000	93,978	46,000	20,884	70.0	104.2
2	(51)	250,000	113,500	225,000	102,150	50,000	22,700	80.0	119.1

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 226 ft. lbs./lb.
- Red ultimate 6,342 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Maxibraid is 75 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test". Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015109, #10018009.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 0.97



Vectrus

Vectrus is a single-braid rope of 100% Vectran™ LCP (Liquid Crystal Polymer) and is always treated with Yale's Maxijacket coating to increase abrasion resistance and enhance the fibers' UV resistance. LCP is more tolerant of tighter bending radii in terminations than other high-modulus fibers. Vectran LCP thrives at high loads and will sustain repeated loads more times than other high-strength, low-stretch fibers. LCP has no tendency to creep, making

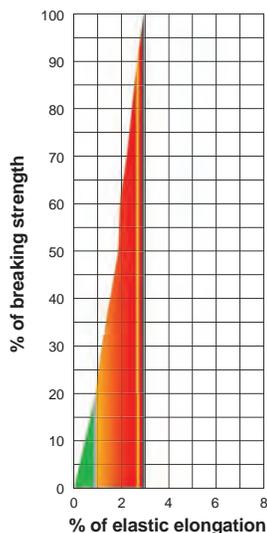
it a perfect solution for some critical applications where little or no dimensional tolerance is acceptable. In fact, Vectrus was one of the products selected to suspend the 40-ft.-diameter acrylic vessel filled with \$225 million of heavy water at the Sudbury Neutrino Observatory (sno.phy.queensu.ca) and has been in service over 10 years, without movement. The 620°F (325°C) melt point also allows this rope to be used in heat applications formerly left only to wire rope.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/16	(2)	800	360	720	324	160	72	0.2	0.3
1/8	(3)	2,300	1,040	2,070	936	460	208	0.5	0.7
5/32	(4)	4,200	1,905	3,780	1,715	840	381	0.9	1.3
3/16	(5)	5,600	2,540	5,040	2,286	1,120	508	1.2	1.8
1/4	(6)	8,200	3,720	7,380	3,348	1,640	744	1.9	2.8
5/16	(8)	13,400	6,080	12,060	5,472	2,680	1,216	2.8	4.2
3/8	(10)	19,200	8,715	17,280	7,844	3,840	1,743	4.4	6.6
7/16	(11)	24,500	11,120	22,050	10,008	4,900	2,224	5.7	8.5
1/2	(13)	32,000	14,525	28,800	13,073	6,400	2,905	7.5	11.2
9/16	(14)	38,000	17,250	34,200	15,525	7,600	3,450	10.3	15.3
5/8	(16)	52,500	23,835	47,250	21,452	10,500	4,767	14.6	21.7
3/4	(19)	70,000	31,780	63,000	28,602	14,000	6,356	20.0	29.8
7/8	(22)	89,000	40,405	80,100	36,365	17,800	8,081	26.2	39.0
1	(25)	109,000	49,485	98,100	44,537	21,800	9,897	32.1	47.8
1-1/4	(32)	147,000	66,735	132,300	60,062	29,400	13,347	47.5	70.7
1-3/8	(35)	187,000	84,895	168,300	76,406	37,400	16,979	60.2	89.6
1-1/2	(38)	210,000	95,340	189,000	85,806	42,000	19,068	70.0	104.2
1-5/8	(41)	245,000	111,230	220,500	100,107	49,000	22,246	82.4	122.7

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 232 ft. lbs./lb.
- Red ultimate 4,446 ft. lbs./lb.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.40

Dielectric Strength: The maximum

allowable leakage for clean, dry Vectrus is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test". Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique:
#10015109, #10018009.



Aracom 100

Aracom 100 is a 12-strand rope comprised of 100% Technora® Aramid fiber. Teijin's Technora® Aramid is selected for this rope due to its ease of handling and reduced internal yarn-on-yarn friction, which greatly increases this Aramid's longevity. Before we twist this fiber, we over apply our own exclusive Aralube coating, which improves its translation efficiency as we process it through our manufacturing facility. The rope is twisted and braided with sufficient

firmness to be considered self-supporting, although many users opt for our Maxijacket urethane-coated version, which greatly increases its abrasion resistance. Aramid has inherent temperature resistance and has little creep once the rope's permanent elongation is exercised out.



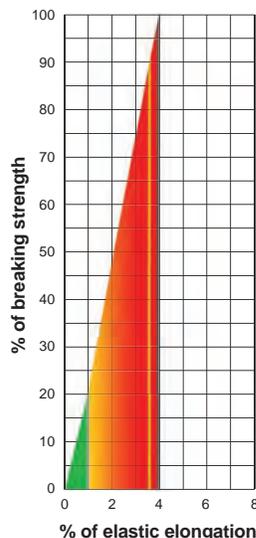
Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/8	(3)	2,200	995	1,980	896	440	199	0.5	0.7
5/32	(4)	3,500	1,585	3,150	1,427	700	317	0.9	1.3
3/16	(5)	4,950	2,245	4,455	2,021	990	449	1.1	1.6
1/4	(6)	8,800	3,995	7,920	3,596	1,760	799	2.0	3.0
5/16	(8)	12,650	5,740	11,385	5,166	2,530	1,148	3.1	4.6
3/8	(10)	17,600	7,990	15,840	7,191	3,520	1,598	4.4	6.6
7/16	(11)	23,650	10,735	21,285	9,662	4,730	2,147	5.6	8.3
1/2	(13)	28,600	12,980	25,740	11,682	5,720	2,596	7.7	11.5
9/16	(14)	37,100	16,840	33,390	15,156	7,420	3,368	10.3	15.3
5/8	(16)	50,000	22,700	45,000	20,430	10,000	4,540	12.5	18.6
3/4	(19)	65,000	29,510	58,500	26,559	13,000	5,902	18.5	27.5
7/8	(22)	84,000	38,135	75,600	34,322	16,800	7,627	24.1	35.9
1	(25)	100,000	45,400	90,000	40,860	20,000	9,080	29.6	44.1

Larger sizes available, contact Yale for details.

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 426 ft. lbs./lb.
- Red ultimate 8,144 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Aracom 100 is 200 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015109, #10018009.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.44



Yalex

Yalex is a single-braid 12-strand rope constructed of premium over finish polyester fiber. Yalex's two-end-per-carrier structure creates a larger void in the middle of the rope, which makes it easier to splice and makes used-rope splicing much easier to perform.

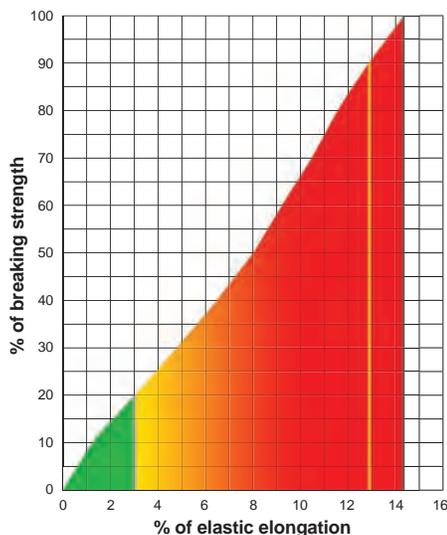
Yalex is coated with our rigger's-grade Maxijacket urethane coating, which reduces the new rope's tendency to snag, greatly enhances abrasion resistance, and is a great way to color code ropes for application or load rating.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/4	(6)	2,500	1,135	2,250	1,022	500	227	2.2	3.3
5/16	(8)	4,000	1,815	3,600	1,634	800	363	2.8	4.2
3/8	(10)	6,000	2,720	5,400	2,448	1,200	544	4.0	6.0
7/16	(11)	10,900	4,945	9,810	4,451	2,180	989	6.5	9.7
1/2	(13)	13,600	6,170	12,240	5,553	2,720	1,234	8.7	13.0
9/16	(14)	16,500	7,490	14,850	6,741	3,300	1,498	11.2	16.7
5/8	(16)	18,500	8,395	16,650	7,556	3,700	1,679	12.1	18.0
3/4	(19)	24,000	10,895	21,600	9,806	4,800	2,179	17.0	25.3
7/8	(22)	35,500	16,115	31,950	14,504	7,100	3,223	25.6	38.1
1	(25)	43,000	19,520	38,700	17,568	8,600	3,904	32.3	48.1
1-1/8	(29)	56,000	25,420	50,400	22,878	11,200	5,084	34.9	52.0
1-1/4	(32)	65,500	29,735	58,950	26,762	13,100	5,947	39.3	58.5
1-5/16	(33)	74,750	33,935	67,275	30,542	14,950	6,787	46.6	69.4
1-1/2	(38)	93,500	42,445	84,150	38,201	18,700	8,489	60.0	89.3
1-5/8	(41)	112,500	51,075	101,250	45,968	22,500	10,215	83.0	123.6
1-3/4	(44)	120,000	54,480	108,000	49,032	24,000	10,896	94.0	140.0
2	(51)	133,200	60,470	119,880	54,423	26,640	12,094	117.0	174.2

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 409 ft. lbs./lb.
- Red ultimate 10,700 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Yalex is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015101.

- Maximum Working Load
 - Minimum Break Strength
 - Average Break Strength
- Specific Gravity: 1.38



Optimus

Optimus is a single-braid 12-strand rope manufactured from a solution-dyed polyester and coated with our riggers-grade, abrasion-resistant coating to maximize protection. The vibrant polyester colorfast fibers are resistant to fading and provide lifelong visibility.

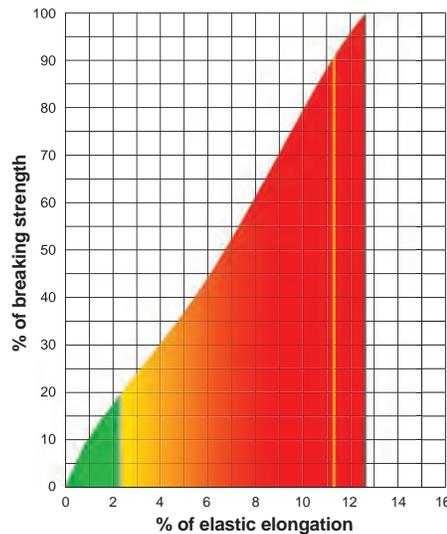
Optimus provides optimal UV and weather resistance while maintaining its lightweight and flexible characteristics. The Optimus is color coded by diameter for easy identification in the field. Manufactured with a braid angle specifically designed for slings and splicing.

Specifications

Diameter		Color	Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)		Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
3/8	(10)	Neon Yellow	6,000	2,720	5,400	2,448	1,200	544	4.0	6.0
1/2	(13)	Neon Green	13,500	6,125	12,150	5,513	2,700	1,225	9.2	13.7
5/8	(16)	Orange	19,000	8,625	17,100	7,763	3,800	1,725	11.7	17.4
3/4	(19)	Blue	25,000	11,350	22,500	10,215	5,000	2,270	16.0	23.8
7/8	(22)	Green	36,000	16,340	32,400	14,706	7,200	3,268	25.0	37.2

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 351 ft. lbs./lb.
- Red ultimate 9,915 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Optimus is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test."

Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015101.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.38

PE-12/Pilot Line

PE-12

PE-12 has been re-engineered, boosting its strengths significantly. Using the same high-tenacity fiber we use in our value-packed Portland Braid, this polyester single braid offers a single-end-per-carrier construction, which keeps the rope from flattening out in service and self centers in sheaves beautifully. PE-12 comes with

the same tough grades of Maxijacket urethane we use on our more expensive products. PE-12 is easy to splice, and field repairs are easily accomplished. It is available in unlimited lengths and brilliant colors for easy identification. PE-12 is torque free and is undamaged when rigging with swivels.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
5/16	(8)	3,900	1,770	3,510	1,593	780	354	2.9	4.3
3/8	(10)	5,900	2,675	5,310	2,408	1,180	535	3.9	5.8
7/16	(11)	10,000	4,540	9,000	4,086	2,000	980	6.4	9.5
1/2	(13)	12,500	5,675	11,250	5,108	2,500	1,135	8.5	12.7
9/16	(14)	15,800	7,170	14,220	6,453	3,160	1,434	10.5	15.6
5/8	(16)	18,500	8,395	16,650	7,556	3,700	1,679	11.4	17.0
3/4	(19)	23,250	10,555	20,925	9,500	4,650	2,111	17.4	25.9
7/8	(22)	34,350	15,590	30,915	14,031	6,870	3,118	25.9	38.6
1	(25)	41,600	18,885	37,440	16,997	8,320	3,777	31.3	46.6

Pilot Line

Pilot Line is a 12-strand 100% polyester single braid with Maxijacket coating to improve abrasion resistance.

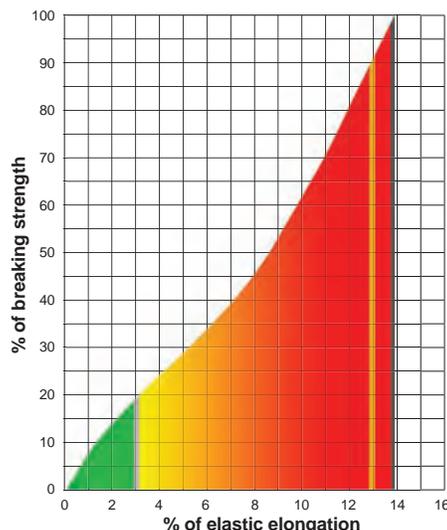
It is used as a pilot line for stringing applications. Available in standard colors of black, blue, green and red. Other colors available upon request.

Specifications

Nominal Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
5/16	(8)	3,600	1,630	3,240	1,467	720	326	2.3	3.4

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 406 ft. lbs./lb.
- Red ultimate 8,738 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry PE-12 and Pilot Line is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015101.

- Maximum Working Load
 - Minimum Break Strength
 - Average Break Strength
- Specific Gravity: 1.38

Phantom-12

Phantom-12 is a specially designed rope for stadium, theatre and set rigging comprised of high-heat-resistant Technora® filament fiber with a wrap of yarn of Yale's Igrip fiber. The Technora® filament provides strength and high-heat resistance where the polyester over-wrap provides a soft hand.

- Grips in your hand comfortably, making rigging and set work easier to grip, hold, adjust and control.

- Grips winch surfaces securely so you can use fewer wraps to control loads more easily.
- Grip will hold highly loaded knots and hitches.
- Glides when released from stoppers and cam devices without kinking or hockling.
- Easily spliced.
- Glides through blocks easily.



Specifications

Solid Color Grip on Natural Technora® (Solid Colors: Red, Navy, Blue, Green, White and Black)

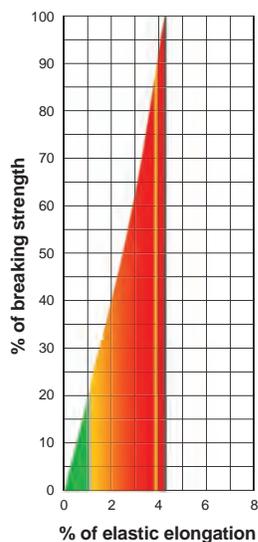
Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
3/8	(10)	6,000	2,720	5,400	2,448	1,200	544	2.5	3.7
7/16	(11)	8,000	3,630	7,200	3,267	1,600	726	3.6	5.4
1/2	(13)	9,800	4,445	8,820	4,001	1,960	889	4.5	6.7
5/8	(16)	16,000	7,260	14,400	6,534	3,200	1,452	7.5	11.2

Black Grip on Black Technora®

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
3/8	(10)	6,000	2,720	5,400	2,448	1,200	544	2.5	3.7
7/16	(11)	8,000	3,630	7,200	3,267	1,600	726	3.6	5.4
1/2	(13)	9,800	4,445	8,820	4,001	1,960	889	4.5	6.7
5/8	(16)	16,000	7,260	14,400	6,534	3,200	1,452	7.5	11.2

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 212 ft. lbs./lb.
- Red ultimate 4,521 ft. lbs./lb.

Dielectric Strength: Due to their moisture gain, high-dielectric applications are not recommended.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.40

PolyPlus Braid



PolyPlus Braid

PolyPlus Braid is an affordable 12-strand single-braid rope constructed of high-tenacity polyester plied over “Para-ep” polyolefin in each individual strand. A unique plying technique as well as a generous proportion of polyester to olefin is coupled with Yale’s exclusive Aralube treatment to optimize the rope’s abrasion resistance. The “Para-ep” provides body to the rope and enhances

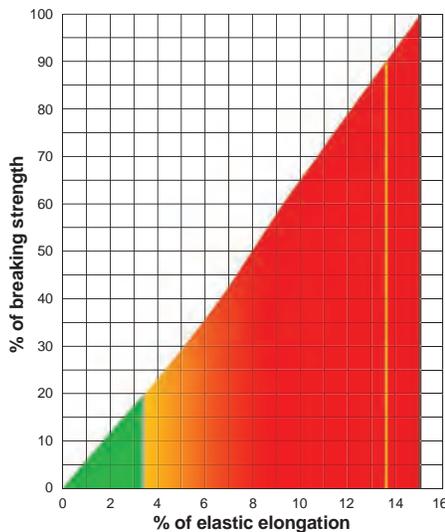
its handling characteristics while keeping the rope’s weight to a minimum. The two-end-per-carrier structure makes the rope very easy to splice, and it is entirely torque balanced. PolyPlus Braid is the strongest single-braid polyester/polyolefin blended rope available and is always manufactured with dual red strands.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/4	(6)	2,300	1,040	2,070	936	460	208	1.5	2.2
3/8	(10)	4,500	2,040	4,050	1,836	900	408	3.5	5.2
7/16	(11)	6,000	2,720	5,400	2,448	1,200	544	4.5	6.7
1/2	(13)	8,500	3,855	7,650	3,470	1,700	771	6.2	9.2
9/16	(14)	10,250	4,650	9,225	4,185	2,050	930	7.1	10.6
5/8	(16)	12,000	5,445	10,800	4,901	2,400	1,089	9.8	14.6
3/4	(19)	17,000	7,715	15,300	6,944	3,400	1,543	13.1	19.5

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope’s rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope’s ability to do “work” and is expressed in foot-pounds per pound of rope in tension.

- Green working 395 ft. lbs./lb.
- Red ultimate 8,228 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry PolyPlus Braid is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 “Routine Production Test.” Absorbed and entrained moisture or impurities will increase rope’s conductivity dramatically.

Approved Splice Technique: #10015101.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.25



Lugger Line

Lugger Line is a 12-strand single braid of copolymer olefins. Polypropylene and high-density polyethylene are coextruded to form the fiber. Upon cooling, the molten polyethylene and polypropylene material coalesce into a unique fiber with tenacity comparable to polyester but without the friction associated with polypropylene

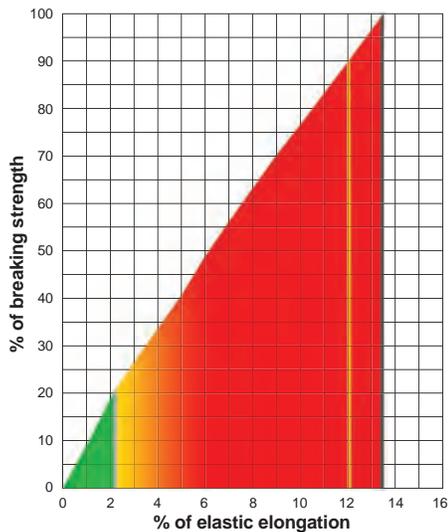
filament. This rope is lightweight, floats, remains flexible even in freezing conditions and won't kink or hockle. Splicing is fast, using our single-braid splice instructions. The standard color for this product is International Orange.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/2	(13)	7,200	3,265	6,480	2,939	1,440	653	4.8	7.1
5/8	(16)	10,000	4,540	9,000	4,086	2,000	908	6.6	9.8
3/4	(19)	13,000	5,900	11,700	5,310	2,600	1,180	8.5	12.7
7/8	(22)	15,800	7,170	14,220	6,453	3,160	1,434	10.4	15.5
1	(25)	21,600	9,805	19,440	8,825	4,320	1,961	14.2	21.1

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 330 ft. lbs./lb.
- Red ultimate 11,400 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Lugger Line is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015101.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 0.95



Crystalyne

Crystalyne is a double-braided rope constructed with an inner load-bearing core of Vectran Liquid Crystal Polymer (LCP) and has a tough polyester outer sleeve. LCP is more tolerant of bending than other high-modulus fibers and is not as affected by overloading. Crystalyne exhibits more tension cycles to higher percentages of break than all our other high-modulus offerings. Unlike Ultra High Molecular Weight Polyethylene UHMWPE ropes, LCP fiber has little or no tendency to creep and can be used to hold tight tolerances

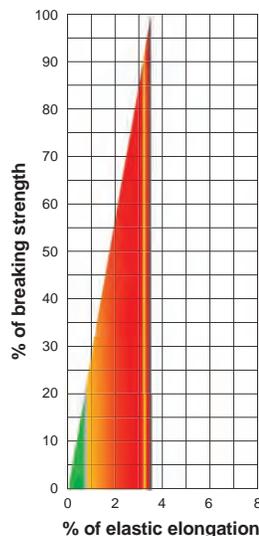
in rope assemblies. In fact, Crystalyne was one of the products selected to suspend the 40-ft.-diameter acrylic vessel filled with \$225 million of heavy water at the Sudbury Neutrino Observatory (sno.phy.queensu.ca) and has been in service over 10 years, without movement. Vectran is hydrophobic, meaning it cannot absorb water. This rope is spliced using the same technique as our Maxibraid Plus, resulting in a termination that finishes shorter than conventional splice techniques and remains supple.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
3/16	(5)	3,000	1,360	2,700	1,224	600	272	1.4	2.1
1/4	(6)	5,000	2,270	4,500	2,043	1,000	454	2.2	3.3
5/16	(8)	7,200	3,265	6,480	2,939	1,440	653	3.0	4.5
3/8	(10)	11,500	5,220	10,350	4,698	2,300	1,044	4.4	6.6
7/16	(11)	15,200	6,900	13,680	6,210	3,040	1,380	6.1	9.1
1/2	(13)	20,000	9,080	18,000	8,172	4,000	1,816	8.5	12.7
9/16	(14)	26,000	11,800	23,400	10,620	5,200	2,360	11.1	16.5
5/8	(16)	30,000	13,620	27,000	12,258	6,000	2,724	12.0	17.9
11/16	(17)	40,000	18,160	36,000	16,344	8,000	3,632	18.8	28.0
3/4	(19)	45,000	20,430	40,500	18,387	9,000	4,086	20.0	29.8
7/8	(22)	63,000	28,600	56,700	25,740	12,600	5,720	24.4	36.3
1	(25)	80,000	36,320	72,000	32,688	16,000	7,264	33.3	49.6
1-1/8	(29)	100,000	45,400	90,000	40,860	20,000	9,080	41.6	61.9
1-1/4	(32)	120,000	54,480	108,000	49,032	24,000	10,896	46.0	68.5

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 187 ft. lbs./lb.
- Red ultimate 3,403 ft. lbs./lb.

Dielectric Strength: Crystalyne's core of LCP is hydrophobic, so its lack of core moisture gain is an advantage, as is its high melt point of 620°F (325°C). The polyester sleeve governs the leakage, which is 100 micro-amperes at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test."

Approved Splice Technique: #10015110, #10018007.

- Maximum Working Load
 - Minimum Break Strength
 - Average Break Strength
- Specific Gravity: 1.40



Mega Max

Mega Max is double braid rope with a unique design that provides the ultimate in abrasion protection while still providing the highest strength possible, all in an Ultra High Molecular Weight Polyethylene UHMWPE fiber construction. The load-bearing core is made of 12-strand Ultrex and provides 100% of the strength in this design. It is then over-braided and protected again by UHMWPE fiber, the most abrasion-resistant fiber available.

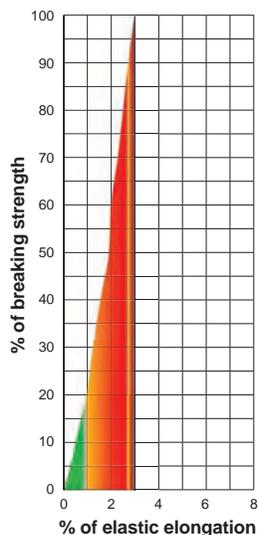
This product floats and works very well on winches, around bollards and through chocks, making it the best solution for lightweight handling on deck. This product is ideally suited for face lines, wing wires, mooring lines and other applications on deck. It is also well suited for use in high-contact abrasion applications as found in commercial fishing, logging and industrial industries.

Specifications

Finished Diameter	Core Diameter	Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
		Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1-1/8	7/8	98,000	44,490	88,200	40,041	19,600	8,898	26.6	39.6
1-5/16	1	120,000	54,480	108,000	49,032	24,000	10,896	35.5	52.9
1-1/2	1-1/4	172,000	78,085	154,800	70,277	34,400	15,617	55.4	82.5

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

■ Green working 318 ft. lbs./lb.

■ Red ultimate 8,300 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Ultrex is 75 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015106, #10018007.

Maximum Working Load

Minimum Break Strength

Average Break Strength

Specific Gravity: 0.97



Ultrex Plus

Ultrex Plus is a double braid constructed of an inner load-bearing core of Ultra High Molecular Weight Polyethylene UHMWPE, treated with Maxijacket coating for enhanced toughness. Sleeved with high tenacity polyester, Ultrex Plus is spliceable using

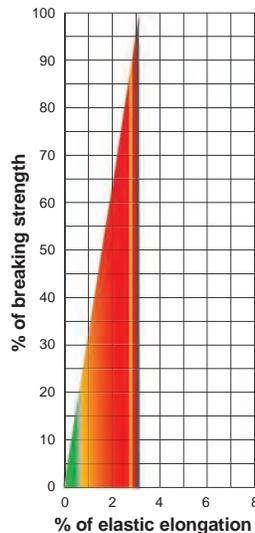
conventional high-modulus splice techniques or the Yale tuck splice, which shortens the bury portion and minimizes the length of the larger diameter associated with a bury-type splice. All strengths shown are for spliced line.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/4	(6)	6,000	2,720	5,400	2,448	1,200	544	2.4	3.6
5/16	(8)	9,500	4,310	8,550	3,879	1,900	862	2.9	4.3
3/8	(10)	12,700	5,765	11,430	5,189	2,540	1,153	3.8	5.7
7/16	(11)	15,300	6,945	13,770	6,251	3,060	1,389	4.9	7.3
1/2	(13)	22,000	9,985	19,800	8,987	4,400	1,997	7.3	10.9
9/16	(14)	28,000	12,710	25,200	11,439	5,600	2,542	9.0	13.4
5/8	(16)	34,000	15,435	30,600	13,892	6,800	3,087	11.6	17.3
3/4	(19)	45,000	20,430	40,500	18,387	9,000	4,086	14.1	21.0
7/8	(22)	63,000	28,600	56,700	25,740	12,600	5,720	22.8	34.0
1	(25)	75,000	34,050	67,500	30,645	15,000	6,810	26.0	38.7
1-1/8	(29)	100,000	45,400	90,000	40,860	20,000	9,080	35.8	53.3
1-1/4	(32)	120,000	54,480	108,000	49,032	24,000	10,896	43.5	64.8
1-5/16	(33)	148,000	67,190	133,200	60,471	29,600	13,438	45.7	68.1
1-1/2	(38)	172,000	78,085	154,800	70,277	34,400	15,617	61.3	91.3
1-5/8	(41)	184,000	83,535	165,600	75,182	36,800	16,707	71.7	106.8
1-3/4	(44)	230,000	104,420	207,000	93,978	46,000	20,884	85.6	127.5
2	(51)	285,000	129,390	256,500	116,451	57,000	25,878	108.6	161.7

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's energy-absorption capability.

- Green working 140 ft. lbs./lb.
- Red ultimate 5,428 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Ultrex Plus is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015106, #10018007.

- Maximum Working Load
 - Minimum Break Strength
 - Average Break Strength
- Specific Gravity: 1.18



Maxibraid Plus

Maxibraid Plus is a double-braided rope constructed of an inner load-bearing core of Ultra High Molecular Weight Polyethylene UHMWPE fiber. The polyester outer sleeve is slightly thicker than UltreX Plus, which will provide more abrasion resistance in high-wear applications. The UHMWPE core is coated with Yale's Maxijacket coating prior to being over-braided, for added toughness.

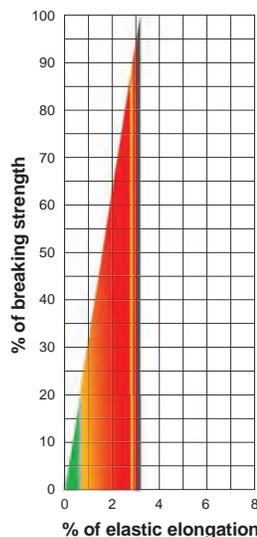
Yale has developed a special splice for larger sizes, which incorporates a tucked core yet is covered as a conventional double braid. The advantage to this splice is no movement of the eye in service and a greatly shortened internal tail, making the rope more flexible and less prone to being damaged adjacent to the eye.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/4	(6)	5,400	2,450	4,860	2,205	1,080	490	2.4	3.6
5/16	(8)	9,300	4,220	8,370	3,798	1,860	844	3.1	4.6
3/8	(10)	12,500	5,675	11,250	5,108	2,500	1,135	4.0	6.0
7/16	(11)	15,000	6,810	13,500	6,129	3,000	1,362	5.6	8.3
1/2	(13)	21,000	9,530	18,900	8,577	4,200	1,906	7.3	10.9
9/16	(14)	28,000	12,710	25,200	11,439	5,600	2,542	9.0	13.4
5/8	(16)	34,000	15,435	30,600	13,892	6,800	3,087	11.6	17.3
3/4	(19)	44,000	19,975	39,600	17,978	8,800	3,995	14.5	21.6
13/16	(21)	48,000	21,790	43,200	19,611	9,600	4,358	17.3	25.8
7/8	(22)	63,000	28,600	56,700	25,740	12,600	5,720	22.8	34.0
1	(25)	75,000	34,050	67,500	30,645	15,000	6,810	27.5	41.0
1-1/8	(29)	100,000	45,400	90,000	40,860	20,000	9,080	35.8	53.3
1-1/4	(32)	112,000	50,845	100,800	45,761	22,400	10,169	38.2	56.9
1-5/16	(33)	123,000	55,840	110,700	50,256	24,600	11,168	45.7	68.1
1-1/2	(38)	160,000	72,640	144,000	65,376	32,000	14,528	55.5	82.6
1-5/8	(41)	170,000	77,180	153,000	69,462	34,000	15,436	71.7	106.8
1-3/4	(44)	214,000	97,155	192,600	87,440	42,800	19,431	85.6	127.5

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's energy absorption capability.

- Green working 115 ft. lbs./lb.
- Red ultimate 4,295 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Maxibraid Plus is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10015106, #10018007.

- Maximum Working Load
 - Minimum Break Strength
 - Average Break Strength
- Specific Gravity: 1.18



Aracom T

Aracom T is a double braid consisting of a Technora® Aramid core with a sleeve of high-tenacity polyester. Yale's exclusive Aralube process infuses the Technora® with molten lubricant prior to entering our twisting equipment. Lab and field experience have shown that this added, internal permanent lubrication (nonsoluble) treatment leads to an extended wear life (as much as four times). It cuts down internal abrasion, reduces filament breakage in processing and

helps us manage fiber tensions in the factory as we ply up a strand. Aracom T maintains a high degree of flexibility and is easily spliced. The polyester sleeve is thicker than its sister product, Miniline, which gives it better protection in high-abrasion applications. The entire strength of Aracom T is derived from the core, and the sleeve's purpose is to protect the core from abrasion.

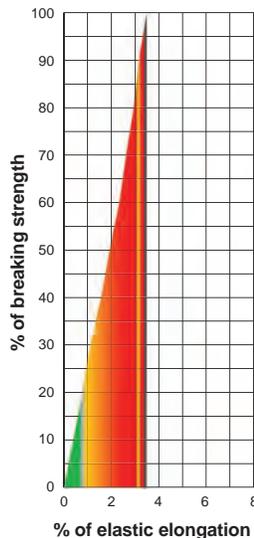


Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
3/16	(5)	4,800	2,175	4,320	1,958	960	435	1.5	2.2
1/4	(6)	6,800	3,085	6,120	2,777	1,360	617	2.7	4.0
5/16	(8)	9,700	4,400	8,730	3,960	1,940	880	3.8	5.7
3/8	(10)	14,000	6,355	12,600	5,720	2,800	1,271	5.1	7.6
7/16	(11)	17,500	7,945	15,750	7,151	3,500	1,589	6.8	10.1
1/2	(13)	23,500	10,665	21,150	9,599	4,700	2,133	8.7	13.0
9/16	(14)	27,500	12,485	24,750	11,237	5,500	2,497	10.0	14.9
5/8	(16)	34,000	15,435	30,600	13,892	6,800	3,087	13.3	19.8
3/4	(19)	39,000	17,705	35,100	15,935	7,800	3,541	16.9	25.2
7/8	(22)	61,000	27,690	54,900	24,921	12,200	5,538	24.5	36.5
1	(25)	80,000	36,320	72,000	32,688	16,000	7,264	32.5	48.4
1-1/8	(29)	95,000	43,130	85,500	38,817	19,000	8,626	45.0	67.0
1-1/4	(32)	108,000	49,030	97,200	44,127	21,600	9,806	51.0	75.9

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working-load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 157 ft. lbs./lb.
- Red ultimate 4,409 ft. lbs./lb.

Dielectric Strength: Due to their moisture gain, high-dielectric applications are not recommended for Aracom T and Aracom Miniline ropes.

Approved Splice Technique: #10018000, #10018007.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.40

Aracom Miniline

Aracom Miniline combines a low helix angle core of Technora® Aramid with a very tightly woven over-braid of thin polyester. Aracom Miniline provides the maximum strength-to-weight ratio in a composite Aramid polyester construction. Aracom Miniline can also be ordered with fuzz fairing, which is highly effective at eliminating strum and reducing drag where application is either hydrodynamic or aerodynamic. Yale's faired ropes can be wound on a reel without any damage to the fairing or rope. Contact Yale for more details.

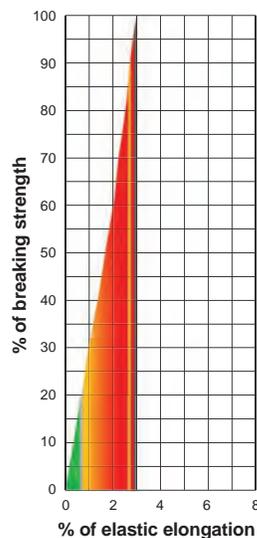


Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/16	(2)	450	200	405	180	90	40	0.2	0.3
3/32	(2.4)	850	385	765	347	170	77	0.4	0.6
1/8	(3)	1,650	745	1,485	671	330	149	0.8	1.2
5/32	(4)	2,400	1,085	2,160	977	480	217	1.0	1.5
3/16	(5)	4,000	1,815	3,600	1,634	800	363	1.7	2.5
1/4	(6)	6,000	2,720	5,400	2,448	1,200	544	2.2	3.3
5/16	(8)	8,000	3,630	7,200	3,267	1,600	726	3.3	4.9
3/8	(10)	12,800	5,810	11,520	5,229	2,560	1,162	4.6	6.8
7/16	(11)	16,900	7,670	15,210	6,903	3,380	1,534	6.7	10.0
1/2	(13)	22,000	9,985	19,800	8,987	4,400	1,997	8.0	11.9
9/16	(14)	30,500	13,845	27,450	12,461	6,100	2,769	10.6	15.8
5/8	(16)	36,000	16,340	32,400	14,706	7,200	3,268	12.0	17.9
3/4	(19)	56,000	25,420	50,400	22,878	11,200	5,084	21.0	31.3
7/8	(22)	78,000	35,410	70,200	31,869	15,600	7,082	25.9	38.6
1	(25)	94,000	42,675	84,600	38,408	18,800	8,535	33.9	50.5

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's energy-absorption capability.

- Green working 100 ft. lbs./lb.
- Red ultimate 4,906 ft. lbs./lb.

Dielectric Strength: Due to their moisture gain, high-dielectric applications are not recommended for Aracom T and Aracom Miniline.

Approved Splice Technique:
#10015111.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.40

Fuzz Fairings:

Yale Cordage designs combinations of high-performance fairings specifically for the ocean environment in almost any configuration. In use, they contribute significantly to drag reduction, strum suppression and longitudinal damping. Some obvious benefits are longer cable life and reduced background noise for better data. Special handling is not required, it won't hamper deployment gear, and it is cost effective. Fairings are used on towed array configurations, drifting buoys, moored arrays (surface and subsurface), and many drogue applications due to a recently developed stiff bristle fairing.

Double Esterlon



Double Esterlon

Double Esterlon is a double-braided rope constructed of premium over finish polyester fiber in both the sleeve and core. This product is identified by two green strands braided into the cover structure and is available with optional Maxijacket urethane coating to further enhance the rope's wear resistance.

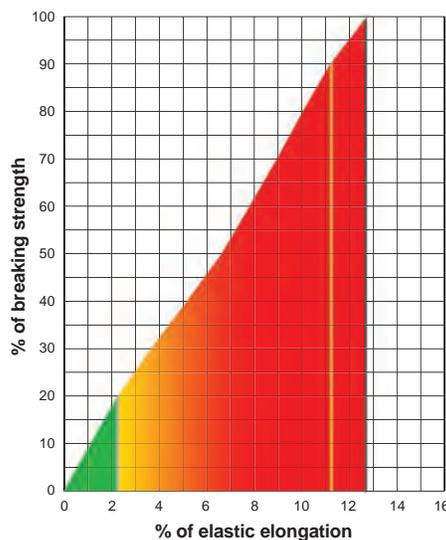
Double Esterlon has low stretch, high dielectric strength, and excellent wear life. Double Esterlon yields the highest-strength double braid polyester available. It is completely spliceable, delivering the cataloged strengths when spliced properly.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/4	(6)	2,700	1,225	2,430	1,103	540	245	2.3	3.4
5/16	(8)	4,000	1,815	3,600	1,634	800	363	3.2	4.8
3/8	(10)	5,600	2,540	5,040	2,286	1,120	508	4.2	6.3
7/16	(11)	7,200	3,265	6,480	2,939	1,440	653	5.5	8.2
1/2	(13)	10,800	4,900	9,720	4,410	2,160	980	7.8	11.6
9/16	(14)	13,290	6,030	11,961	5,427	2,658	1,206	9.6	14.3
5/8	(16)	17,000	7,715	15,300	6,944	3,400	1,543	13.7	20.4
3/4	(19)	20,800	9,440	18,720	8,496	4,160	1,888	16.7	24.9
7/8	(22)	31,000	14,070	27,900	12,663	6,200	2,814	24.0	35.7
1	(25)	44,000	19,975	39,600	17,978	8,800	3,995	34.5	51.4
1-1/16	(27)	47,000	21,335	42,300	19,202	9,400	4,267	39.5	58.8
1-1/8	(29)	50,000	22,700	45,000	20,430	10,000	4,540	43.3	64.5
1-1/4	(32)	57,800	26,240	52,020	23,616	11,560	5,248	53.5	79.7
1-5/16	(33)	63,800	28,965	57,420	26,069	12,760	5,793	58.0	86.4
1-1/2	(38)	76,200	34,590	68,580	31,131	15,240	6,918	69.3	103.2
1-5/8	(41)	89,250	40,515	80,325	36,464	17,850	8,103	85.0	126.6
1-3/4	(44)	106,600	48,395	95,940	43,556	21,320	9,679	104.0	154.9
2	(51)	127,100	57,700	114,390	51,930	25,420	11,540	124.0	184.7

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the line's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope. Double Esterlon is made to Yale Cordage Specification #YCI-DE-022.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

■ Green working 291 ft. lbs./lb.

■ Red ultimate 7,711 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Double Esterlon is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10017200.

Maximum Working Load

Minimum Break Strength

Average Break Strength

Specific Gravity: 1.38



Portland Braid

Portland Braid double-braided polyester offers high value at a very competitive price. Built in the same manner as our Double Esterlon, Portland Braid offers consistent performance at an economical price. The fiber used to produce Portland Braid is

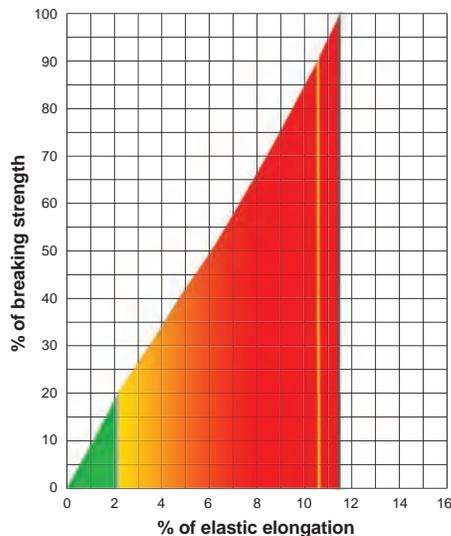
sourced from Yale's qualified suppliers. Portland Braid can be special ordered in ultra-long continuous lengths. We also offer our optional Maxijacket urethane coating to further enhance the rope's wear resistance.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/4	(6)	2,300	1,040	2,070	936	460	208	2.2	3.3
5/16	(8)	3,600	1,630	3,240	1,467	720	326	3.5	5.2
3/8	(10)	4,900	2,220	4,410	1,998	980	444	5.0	7.4
7/16	(11)	6,600	2,995	5,940	2,696	1,320	599	6.3	9.4
1/2	(13)	10,000	4,540	9,000	4,086	2,000	908	7.9	11.8
9/16	(14)	11,100	5,035	9,990	4,532	2,220	1,007	10.0	14.9
5/8	(16)	14,900	6,760	13,410	6,084	2,980	1,352	13.0	19.4
3/4	(19)	18,000	8,170	16,200	7,353	3,600	1,634	16.4	24.4
7/8	(22)	29,450	13,370	26,505	12,033	5,890	2,674	27.1	40.4
1	(25)	38,400	17,430	34,560	15,687	7,680	3,486	36.6	54.5
1-1/8	(29)	45,000	20,430	40,500	18,387	9,000	4,086	43.5	64.8
1-1/4	(32)	52,000	23,605	46,800	21,245	10,400	4,721	54.0	80.4
1-1/2	(38)	67,000	30,415	60,300	27,374	13,400	6,083	69.2	103.0
1-3/4	(44)	95,000	43,130	85,500	38,817	19,000	8,626	103.0	153.4
2	(51)	124,000	56,295	111,600	50,666	24,800	11,295	132.0	196.6
2-1/4	(57)	150,000	68,100	135,000	61,290	30,000	13,620	155.0	230.8
2-1/2	(64)	168,200	76,360	151,380	68,724	33,640	15,272	172.6	257.0
2-5/8	(67)	210,000	95,340	189,000	85,806	42,000	19,068	220.0	327.6

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 265 ft. lbs./lb.
- Red ultimate 5,929 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Portland Braid is 100 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10017200.

- Maximum Working Load
 - Minimum Break Strength
 - Average Break Strength
- Specific Gravity: 1.38



Polydyne

Polydyne is a double-braided rope that utilizes a polyester sleeve over a nylon core. Despite the dissimilar stretch characteristics of these fibers, Yale engineers have produced constructions where both fibers contribute. The resulting rope has high breaking strength and more stretch in its working load range, which in many applications is a plus. Polydyne is up to taking more dynamic abuse

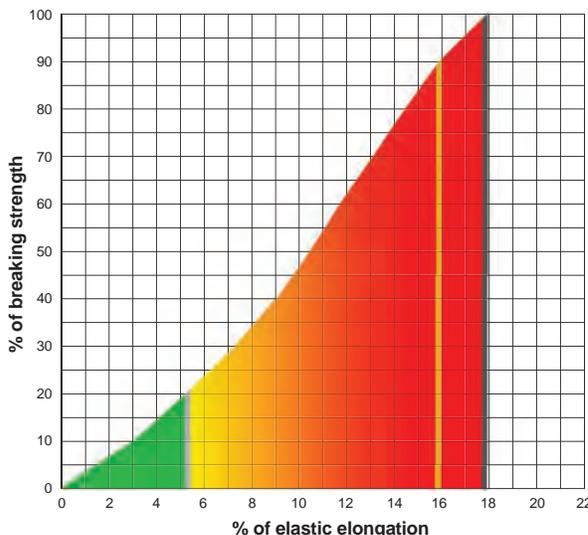
without being degraded prematurely. Take special note of the working energy-absorption rating, which is the amount of energy a rope absorbs before reaching its working load. The ultimate energy absorption of this rope is also correspondingly high. All this and a tough polyester jacket make this a long-wearing rope with extraordinary dynamic capabilities.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/4	(6)	2,500	1,135	2,250	1,022	500	227	1.9	2.8
5/16	(8)	3,800	1,725	3,420	1,553	760	345	2.8	4.2
3/8	(10)	5,000	2,270	4,500	2,043	1,000	454	4.4	6.6
7/16	(11)	7,500	3,405	6,750	3,065	1,500	681	5.8	8.6
1/2	(13)	11,000	4,990	9,900	4,491	2,200	998	7.6	11.3
9/16	(14)	15,000	6,810	13,500	6,129	3,000	1,362	9.7	14.4
5/8	(16)	18,900	8,580	17,010	7,722	3,780	1,716	13.6	20.3
3/4	(19)	26,000	11,800	23,400	10,620	5,200	2,360	18.5	27.5
7/8	(22)	33,600	15,250	30,240	13,725	6,720	3,050	24.4	36.3
1	(25)	42,000	19,065	37,800	17,159	8,400	3,813	31.5	46.9
1-1/8	(29)	52,000	23,605	46,800	21,245	10,400	4,721	41.5	61.8
1-1/4	(32)	65,000	29,510	58,500	26,559	13,000	5,902	50.8	75.6
1-5/16	(33)	77,000	34,955	69,300	31,460	15,400	6,991	55.0	81.9
1-1/2	(38)	90,000	40,860	81,000	36,774	18,000	8,172	66.0	98.3

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 576 ft. lbs./lb.
- Red ultimate 11,187 ft. lbs./lb..

Dielectric Strength: The maximum allowable leakage for clean, dry Polydyne is 500 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10017200.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.24



Yalon

Yalon is a double-braided rope constructed of a nylon core and sleeve. It offers high energy absorption, controlled stretch and exceeds the strength requirements of MIL-DTL-24050. Yalon is

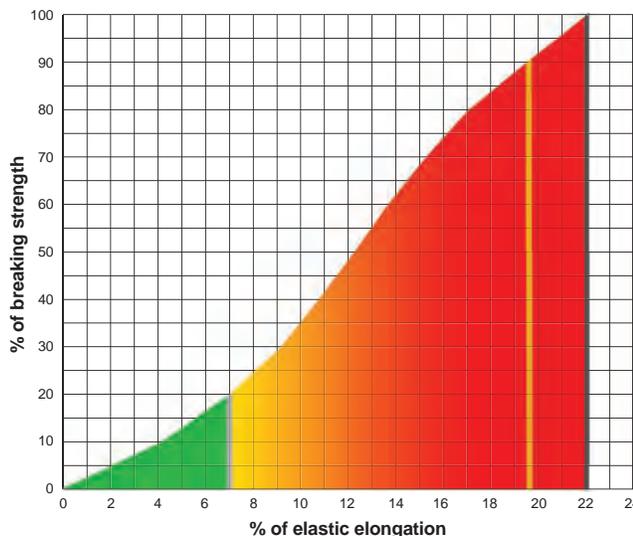
easily spliced and can be purchased with our optional Maxijacket coating for enhanced abrasion protection or to color code lines for a given application. Available in solid white or solid black.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 5:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
1/4	(6)	2,100	950	1,890	855	420	190	1.5	2.2
5/16	(8)	3,500	1,585	3,150	1,427	700	317	2.8	4.2
3/8	(10)	4,800	2,175	4,320	1,958	960	435	3.7	5.5
7/16	(11)	6,500	2,950	5,850	2,655	1,300	590	5.3	7.9
1/2	(13)	8,300	3,765	7,470	3,389	1,660	753	7.0	10.4
9/16	(14)	12,000	5,445	10,800	4,901	2,400	1,089	10.0	14.9
5/8	(16)	17,000	7,715	15,300	6,944	3,400	1,543	13.0	19.4
3/4	(19)	21,000	9,530	18,900	8,577	4,200	1,906	16.2	24.1
7/8	(22)	29,500	13,390	26,550	12,051	5,900	2,678	23.3	34.7
1	(25)	34,000	15,435	30,600	13,892	6,800	3,087	28.5	42.4
1-1/8	(29)	47,500	21,565	42,750	19,409	9,500	4,313	37.7	56.1
1-1/4	(32)	53,000	24,060	47,700	21,654	10,600	4,812	43.9	65.4
1-5/16	(33)	61,000	27,690	54,900	24,921	12,200	5,538	49.6	73.9
1-1/2	(38)	80,000	36,320	72,000	32,688	16,000	7,264	61.1	91.0
1-5/8	(41)	88,500	40,175	79,650	36,158	17,700	8,035	68.5	102.0
1-3/4	(44)	106,000	48,120	95,400	43,308	21,200	9,624	85.9	127.9
2	(51)	129,000	58,565	116,100	52,709	25,800	11,713	101.0	150.4
2-1/4	(57)	168,000	76,270	151,200	68,643	33,600	15,254	131.0	195.1

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 796 ft. lbs./lb.
- Red ultimate 11,871 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Yalon is 2 milli-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10017200.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.14



Kernmaster

Kernmaster is a static-rappelling line constructed with a traditional "mantle" sleeve consisting of 48 strands of polyester. The inside, or "kern," is a braided core of energy-absorbing nylon. The core is fully steam-stabilized to enhance the rope's flexibility and prevent hardening in service; the braid also bends more easily and with less

fatiguing of the core when cycled over sheaves or dropped over a parapet. The sleeve is either white with red tracers or solution-cast fiber (color added prior to yarn production), which makes for lasting colors and enhanced wear resistance.

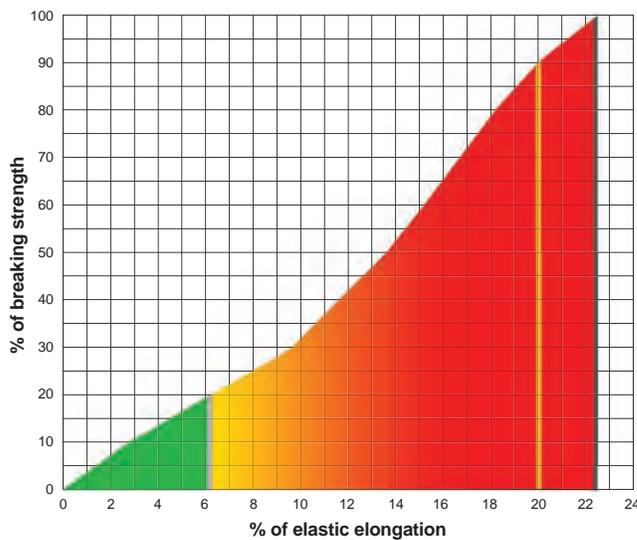
Standards: 11 mm, 13 mm: CE0120 EN1891 Type A

Specifications

Diameter		Average Break Strength*		Minimum Break Strength*		Maximum** Working Load 10:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
3/8	(10)	4,000	1,815	3,600	1,634	400	182	4.0	6.0
7/16	(11)	7,100	3,220	6,390	2,898	710	322	5.5	8.2
1/2	(13)	9,200	4,175	8,280	3,758	920	418	7.6	11.3
5/8	(16)	12,500	5,675	11,250	5,108	1,250	568	11.4	17.0

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** For situations where a person is NOT on the rope, the working load may be doubled (5:1).



Energy Absorption

The colored area under the curve represents the rope's energy-absorption capability.

■ Green working 622 ft. lbs./lb.

■ Red ultimate 9,775 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Kernmaster is 500 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test." Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

— Maximum Working Load

— Minimum Break Strength

— Average Break Strength

Specific Gravity: 1.23

Tech-Kern

Tech-Kern is a Kernmantle-style rope consisting of a braided Technora® Aramid core covered by a 48-strand Technora® mantle. If you are familiar with our Kernmaster, you already know the advantages of a braided-core rappelling line. The Tech-Kern was designed to bring the highest heat resistance to the market.

Technora® has a high melting point and acts as a heat sink when used with high-friction applications, as with descent devices. If heat is on your mind, consider Tech-Kern.

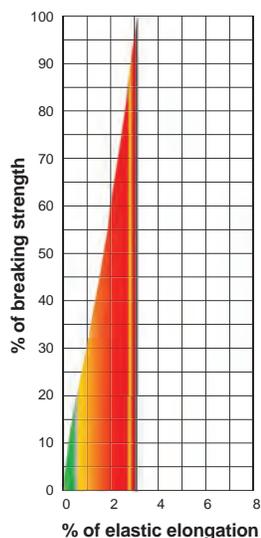


Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 10:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
0.45	(11.4)	21,000	9,530	18,900	8,577	2,100	953	7.6	11.3

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** For situations where a person is NOT on the rope, the working load may be doubled (5:1).



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

■ Green working 233 ft. lbs./lb.

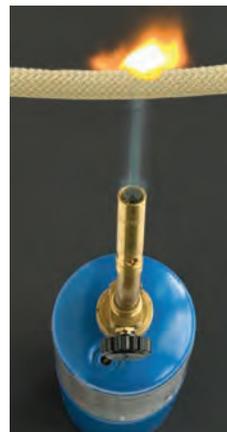
■ Red ultimate 4,571 ft. lbs./lb.

Dielectric Strength: Due to their moisture gain, high-dielectric applications are not recommended.

Approved Splice Technique: #10018000.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.44





Uniline T&D (double-wrap tape)



Uniline ND (single-wrap tape)

Uniline

Uniline is a parallel-core cable of PET (polyester) filament. The Uniline core is bonded together with a rubber-based adhesive, wrapped with red rubber tape, over-braided with a tough polyester sleeve and entirely saturated with another rubber solution. The cable is then cured in an oven, causing the rubber to advance to a solid layer with very tough mechanical properties. The red rubber layer not only acts as a moisture barrier, but is also a wear indicator. This cable carries a 4:1 workload rating for overhead work and a 3:1 rating for underground work. Uniline is the toughest conventional polyester stringing line you can buy and minimizes the elasticity

and stretchiness seen in polyester ropes. Ropes removed from machines having seen 20 years of service regularly test at 75% of the original strength and above. Uniline can be spliced both in eyes and as a running splice, delivering the full strength as cataloged. Alternately, Uniline can be terminated and/or end-for-end joined together with our Techeye3 and Techjoin3 products.

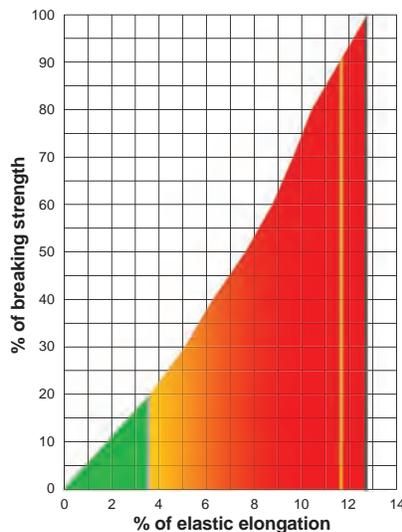
Uniline Lifeline is a specialized construction utilizing a solution-dyed polyester sleeve and no additional external coating. This product is available in only 1/2" and 5/8" diameters in the following color options - solid orange, solid black and solid gray.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 4:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs/100ft	Kg/100m
3/8	(10)	6,000	2,720	5,400	2,448	1,500	680	7.0	10.4
1/2	(13)	10,500	4,765	9,450	4,289	2,625	1,191	10.0	14.9
5/8	(16)	17,200	7,805	15,480	7,025	4,300	1,951	15.6	23.2
3/4	(19)	24,200	10,985	21,780	9,887	6,050	2,746	21.7	32.3
7/8	(22)	32,800	14,890	29,520	13,401	8,200	3,723	30.6	45.6
1	(25)	42,200	19,155	37,980	17,240	10,550	4,789	38.7	57.6
1-1/8	(29)	53,000	24,060	47,700	21,654	13,250	6,015	48.8	72.7
1-1/4	(32)	64,500	29,280	58,050	26,352	16,125	7,320	60.4	89.9
1-3/8	(35)	78,000	35,410	70,200	31,869	19,500	8,853	73.1	108.9
1-1/2	(38)	92,000	41,765	82,800	37,589	23,000	10,441	86.9	129.4
1-5/8	(41)	108,000	49,030	97,200	44,127	27,000	12,258	102.1	152.0
1-3/4	(44)	125,000	56,750	112,500	51,075	31,250	14,188	118.4	176.3
1-7/8	(48)	144,000	65,375	129,600	58,838	36,000	16,344	135.3	201.5
2	(51)	164,000	74,455	147,600	67,010	41,000	18,614	155.0	230.8

* Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

- Green working 262 ft. lbs./lb.
- Red ultimate 5,230 ft. lbs./lb.

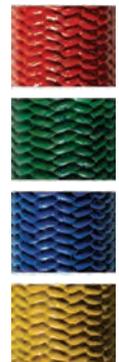
Dielectric Strength: The maximum allowable leakage for clean, dry Uniline is 50 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test". Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10018010, #10018051.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.38

Custom colors for Uniline (Minimum order required)





Unitrex

Unitrex XS Max Wear is a parallel-core rope of Ultra High Molecular Weight Polyethylene UHMWPE fiber, wrapped with a neoprene tape and over-braided with a tough jacket of high-tenacity polyester. The result is a synthetic cable, somewhat stiffer than your usual rope, which is much like wire in its stretch characteristics. Unlike wire, it is much lighter and easily handled. Due to its toughness, we are comfortable assigning it a higher working load rating, which is 25% of its breaking strength.

Unitrex XS Max Wear has high strength retention in service, which is

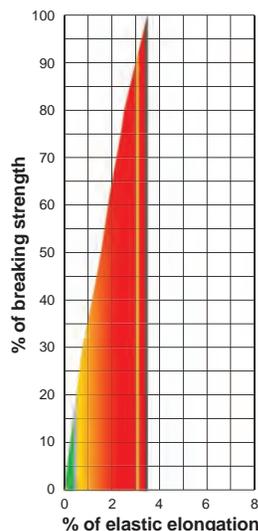
supported by field studies and our long-standing track record with Uniline polyester. Unitrex's tough rubber layer protects its high-modulus UHMWPE core, and the outer jacket is saturated with urethane, making it the toughest UHMWPE rope you can buy. All of Yale's parallel-core ropes are torque free, with bonded cores preventing contamination of the internal strength member. Unitrex XS can be quickly terminated or joined with a TechEye2 or TechJoin2, found on page 46.

Specifications

Diameter		Average Spliced Break Strength*		Minimum Spliced Break Strength*		Maximum** Working Load 4:1		Weight	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Lbs	Lbs/100ft	Kg/100m
0.44	(11)	20,000	9,080	18,000	8,172	5,000	2,270	6.7	10.0
0.53	(13)	26,000	11,800	23,400	10,620	6,500	2,950	9.2	13.7
0.58	(15)	34,000	15,435	30,600	13,892	8,500	3,859	11.4	17.0
0.63	(16)	42,500	19,295	38,250	17,366	10,625	4,824	13.5	20.1
0.71	(18)	50,500	22,925	45,450	20,633	12,625	5,731	16.9	25.2
0.84	(21)	73,500	33,365	66,150	30,029	18,375	8,341	24.2	36.0
1.00	(25)	100,000	45,400	90,000	40,860	25,000	11,350	32.4	48.2
1.15	(29)	125,000	56,750	112,500	51,075	31,250	14,188	42.4	63.1
1.25	(32)	158,000	71,730	142,200	64,557	39,500	17,933	52.5	78.2
1.40	(36)	195,000	88,530	175,500	79,677	48,750	22,133	64.9	96.6
1.75	(44)	264,000	119,855	237,600	107,870	66,000	29,964	92.6	137.9
1.94	(49)	310,000	140,740	279,000	126,666	77,500	35,185	98.8	147.1
1.99	(51)	360,000	163,440	324,000	147,096	90,000	40,860	113.3	168.7
2.20	(56)	430,000	195,220	387,000	175,698	107,500	48,805	144.0	214.4

* Knots and abrupt bends significantly reduce the strength of all ropes and lower maximum working load.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Energy Absorption

The colored area under the curve represents the rope's ability to do "work" and is expressed in foot-pounds per pound of rope in tension.

■ Green working 247 ft. lbs./lb.

■ Red ultimate 6,893 ft. lbs./lb.

Dielectric Strength: The maximum allowable leakage for clean, dry Unitrex is 50 micro-amperes when tested at 100kV per Yale Method 712-1701 Rev 1 "Routine Production Test". Absorbed and entrained moisture or impurities will increase rope's conductivity dramatically.

Approved Splice Technique: #10018010, #10018008.

- Maximum Working Load
- Minimum Break Strength
- Average Break Strength

Specific Gravity: 1.10

Fortis² Sling



Fortis² Sling

U.S. Patent No. 9,296,593 B2 - Singapore Patent No. 11201507689
China Patent No. CN 105209368 - Australia Patent No. 2014239887 AU
South Africa Patent No. 2015/07153

Fortis² Slings are heavy-lift, multipart slings made with our Unitrex XS Max Wear synthetic cable that has a core of Ultra High Molecular Weight Polyethylene UHMWPE fiber encased with neoprene and a tough braided jacket of high-tenacity polyester. The result is a heavy-lift sling of Unitrex XS that has the durability and stiffness of a wire rope sling at a fraction of the weight.

- 80% lighter than a comparable wire rope sling
- Stiff enough to push under objects
- More durable than traditional fiber slings
- One person able to lift eye to crane hook
- Easy to inspect for damage
- Will not corrode or rust
- Will not soak up water or freeze

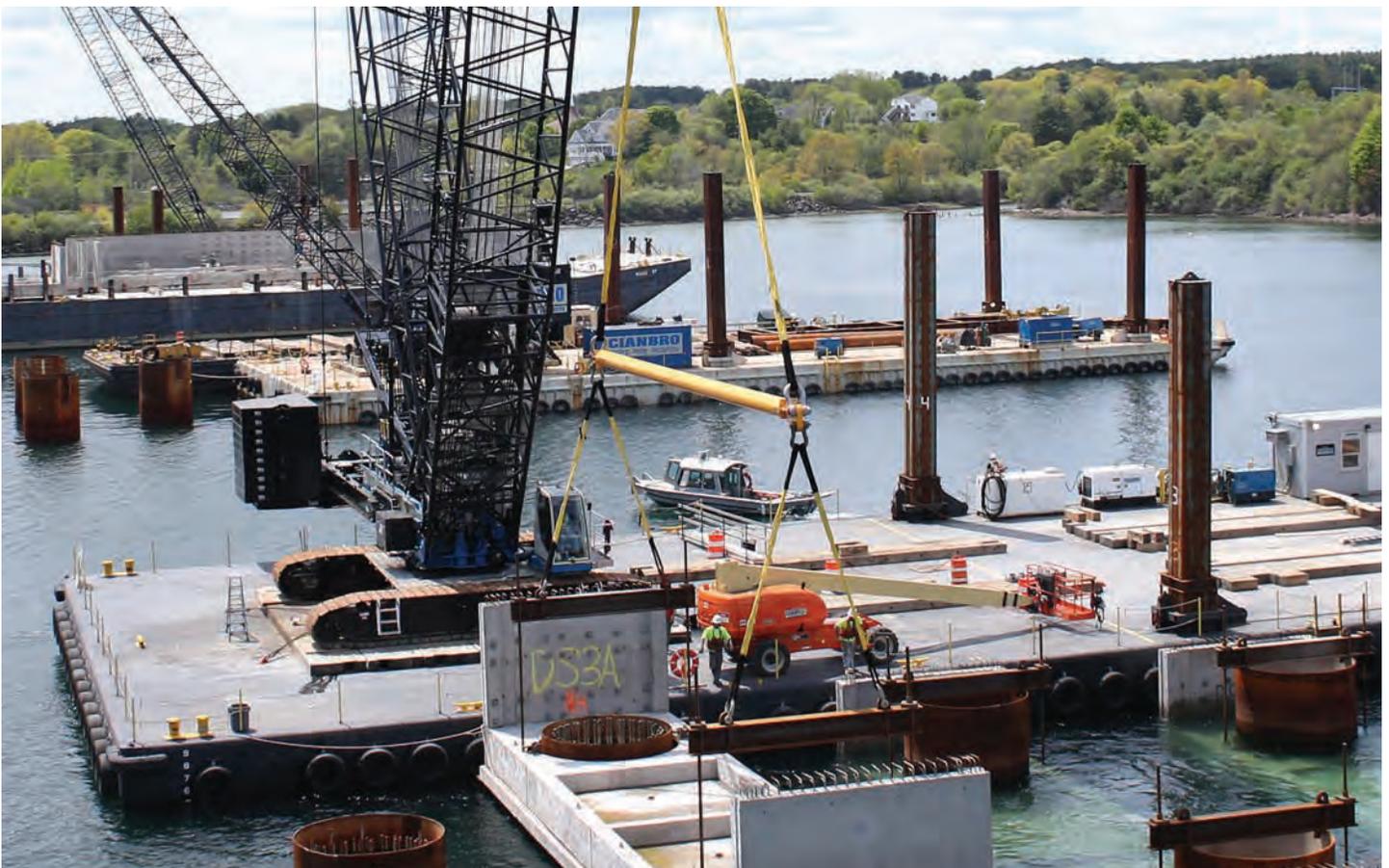


The Chafe Pro[®] HB Series is constructed of multiple layers of FJORD, Inc.'s specially formulated and designed heavy-duty nylon weaves. Abrasion testing has shown the Chafe-Pro HB Series to be more resistant to chafe abrasion than marine-grade fire hose and chafing gear made from such materials as ultra-high-molecular-weight polyethylene (UHMPE), Kevlar[®], etc.

- Chafe-Pro HB series multi-layer design
- Easily removable for inspection
- Chafe-Pro Shore Grip Technology on inner layer prevents slipping on eye
- Easy latch system for quick opening of the material

Fortis² slings are tagged with the Etiflex tag.

- Ratings and warnings are molded into the tag, not printed
- Excellent abrasion resistance
- Resistant to most solvents and petroleum products
- Excellent UV resistance and all temperature performance
- High-visibility, two-color design
- Labels will not stain or mildew



Specifications

Weight Comparison

15 Ft Sling	Rated Capacity Vertical Tons	Unit Weight in Lbs	Weight per Rated Ton
Fortis ² Sling	50	44	0.9
9-Part Wire Rope	56	254	4.5
3-Part Wire Rope	46	200	4.4
Grade 80 Chain	36	363	10.1

Sling Model	Color	Rated Capacity*			Weight Per Foot Lbs	Standard Eye Size Inches	Minimum Length Feet
		Lbs					
		Vertical	Basket	Choker			
44	Blue	28,000	56,000	22,400	0.7	22	7
53	Green	35,000	70,000	28,000	0.9	24	8
58	Orange	46,000	92,000	36,800	1.2	26	9
63	Yellow	58,000	116,000	46,400	1.4	28	10
71	Black	68,000	136,000	54,400	1.7	30	11
84	Blue	100,000	200,000	80,000	2.4	35	13
100	Green	128,000	256,000	102,400	3.3	40	15
115	Orange	160,000	320,000	128,000	4.3	45	17
125	Yellow	202,000	404,000	161,600	5.3	50	19
140	Black	250,000	500,000	200,000	6.6	55	21
170	Blue	338,000	676,000	270,400	9.4	60	24
180	Green	397,000	794,000	317,600	10.0	70	27
190	Orange	461,000	922,000	368,800	11.4	80	29
220	Yellow	550,000	1,100,000	440,000	14.5	90	33

* Rated capacity is based on 5:1 Design Factor.



Fortis² models 84 and up now come with standard ChafePro[®] HB Series chafe protection for the eye of the sling.

Available on other Fortis² sling sizes upon request.

The Inside Story

LOUPS™ are the most efficient synthetic slings available and far lighter than steel or conventional round slings. LOUPS bend gracefully. If you look inside a LOUP, you will find just one continuous looped piece of rope (Figure 1), which has been end-for-end spliced to itself.

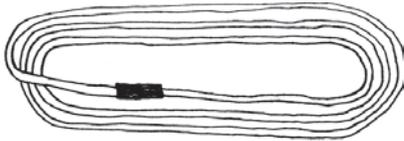
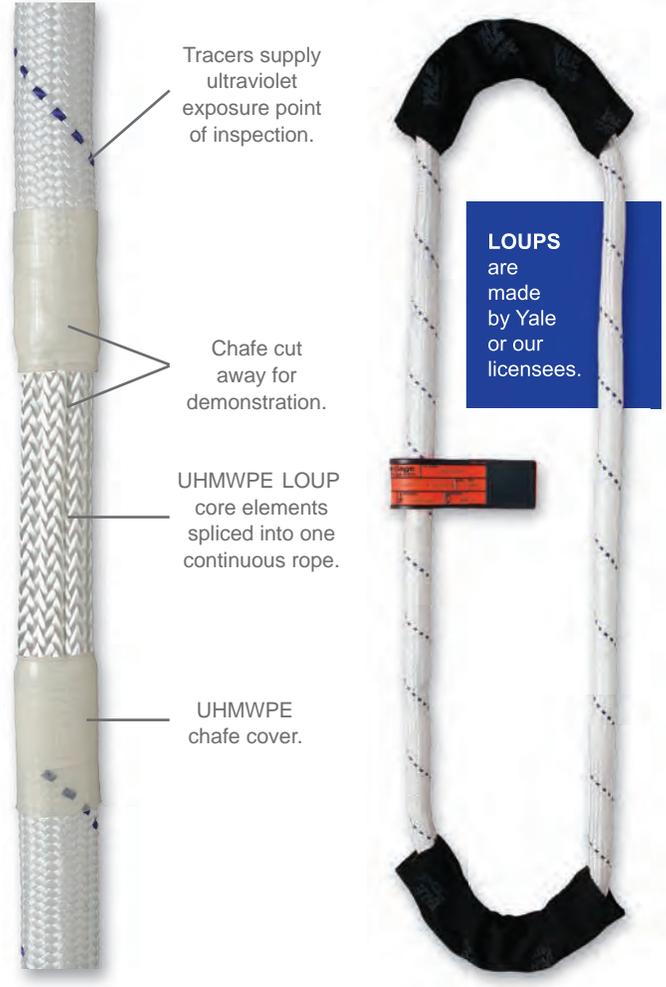


Figure 1

The diameter of the LOUP core and the number of wraps vary by the tensile strength of the LOUP Yale is building. Since the strength element is small, the D/D ratio (or bending radius) is improved. Simply put, LOUPS are less affected by sharp bending radii than larger ropes of comparable strength. LOUPS can be produced as small as 3" in length and as large as 5 million lbs. tensile.

LOUPS through Model 13A06 are annealed. Through an exhaustive research and development program, the right combination of stress and heat was identified, which now allows us to ship LOUPS at their full strength potential. LOUPS tell you when the sun has taken its toll. The distinctive tracer strands of LOUPS are, by design, more susceptible to ultraviolet attack than the rest of the sling. So, when the tracer yarns, which are nonload-bearing, start to break and fall out, it is time for you to replace the LOUP.



LOUPS™

LOUPS high-modulus endless slings, by Yale Cordage or a Yale Cordage licensee, significantly advance the technology of lifting slings by utilizing a strength-optimizing, multiple-strand endless braid of Ultra High Molecular Weight Polyethylene UHMWPE fiber encased in a polyethylene abrasion sleeve.

The completed LOUP then undergoes Yale's proprietary annealing process, which elevates the tensile strength by up to four times that of similar-sized polyester-fiber-based slings. For longer or shorter lengths, call for availability. Optional proof loading available.

Specifications

Model	Diameter		Vertical Capacity*		Choker Capacity*		Basket Capacity*		Base Length	Max. Length
	Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Feet	Feet
4A03	0.39	(10)	4,280	1,941	3,638	1,650	8,560	3,883	2	40
4A04	0.44	(11)	5,700	2,586	4,845	2,198	11,400	5,171	2	40
4A05	0.48	(12)	7,140	3,239	6,069	2,753	14,280	6,477	2	40
7A02	0.54	(14)	8,560	3,883	7,276	3,300	17,120	7,766	2	40
7A03	0.67	(17)	12,800	5,806	10,880	4,935	25,600	11,612	4	40
7A04	0.71	(18)	17,100	7,756	14,535	6,593	34,200	15,513	4	40
7A06	0.83	(21)	25,600	11,612	21,760	9,870	51,200	23,224	4	40
7A07	0.91	(23)	29,800	13,517	25,330	11,489	59,600	27,034	4	40
7A08	0.98	(25)	34,000	15,422	28,900	13,109	68,000	30,844	6	40
13A04	1.18	(30)	50,800	23,042	43,180	19,586	101,600	46,085	6	40
13A05	1.30	(33)	63,400	28,758	53,890	24,444	126,800	57,515	6	40
13A06	1.38	(35)	76,000	34,473	64,600	29,302	152,000	68,946	6	40

* Rated capacity is based on 5:1 Design Factor

Industrial LOUPS™

Industrial LOUPS high-modulus endless slings, by Yale Cordage or a Yale Cordage licensee, significantly advance the technology of lifting slings by utilizing a strength-optimizing, multiple-strand endless braid of UHMWPE fiber encased in a

polyethylene or polyester abrasion sleeve. For longer or shorter lengths, call for availability. Optional proof loading available.

Specifications

	Model	Diameter		Vertical Capacity*		Choker Capacity*		Basket Capacity*		Base Length
		Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Feet
UHMWPE Sleeve	13N08	1.7	(44)	83,776	38,001	71,210	32,301	167,552	76,002	6
	13N10	1.9	(47)	104,720	47,501	89,012	40,376	209,440	95,002	6
	19N06	2.3	(58)	126,000	57,154	107,100	48,581	252,000	114,307	6
	19N07	2.4	(61)	147,000	66,679	124,950	56,677	294,000	133,358	6
	19N08	2.6	(65)	168,000	76,205	142,800	64,774	336,000	152,410	6
	19N10	2.9	(74)	210,000	95,256	178,500	80,968	420,000	190,512	6
Polyester Sleeve	32N05	3.6	(91)	240,800	109,227	204,680	92,843	481,600	218,454	8
	32N06	3.9	(99)	288,960	131,072	245,616	111,411	577,920	262,145	8
	32N07	4.1	(105)	337,120	152,918	286,552	129,980	674,240	305,835	8
	32N08	4.4	(112)	385,280	174,763	327,488	148,549	770,560	349,526	8
	32N10	4.9	(124)	481,600	218,454	409,360	185,686	963,200	436,908	10
	32N12	5.3	(134)	577,920	262,145	491,232	222,823	1,155,840	524,289	10

* Rated capacity is based on 5:1 Design Factor



ZipGrip

U.S. Pat. No. 9,616,579
Canada Patent No. 2,965,100 CN

ZipGrip is a patent-pending system to allow the installation of a pulling or holdback eye on various cylindrical or nearly cylindrical substrates. These units were primarily developed for use in the offshore pipe lay and umbilical installation and maintenance arena.

Yale Cordage started manufacturing our line of YaleGrips synthetic pulling and stopping grips more than 20 years ago, and they have been used successfully worldwide for the deployment of umbilicals, hard pipes, flex cables and armored cables.

Our ZipGrip design is based on the same successful platform, and it utilizes the Aramid grip stock in a new design, which not only decreases the overall grip length by approximately 75%, but also significantly increases the working load and distributes the compressive forces, preventing damage to the pipe's outer layers.

ZipGrip lengths when installed are approximately 1/3 of the installed length of our time-tested YaleGrips product. As a guideline, the installed length is 19 times the pipe diameter.

Example pipe: 170 mm = 3,230 mm installed length.

ZipGrips are very fast to install and even faster to remove. Install times are generally 10%–20% of a similar working load and diameter YaleGrips. They also require less application space because you are not dealing with extremely long tails. The installation zone needed is only about 10% longer than the installed length.

ZipGrips can be installed on a coiled pipe or umbilical. No need to fully straighten it prior to installation.

Units are custom designed to the specific pipe or umbilical diameter and load requirements.

Construction: Standard product is made with Technora®. Technora® Aramid fiber is high strength, low stretch, heat resistant and lightweight.

Installation/Removal: Quick and easy to install and remove; temporary or permanent; install at any point along the pipeline.

Uses: Pipe lay install or holdback; umbilical install or holdback; pipeline catenary float attachment.



Specifications

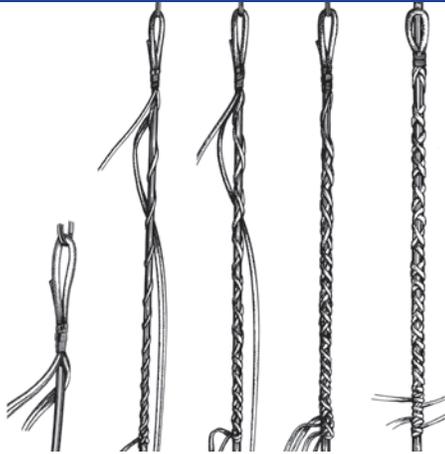
ZipGrip Properties for a Selection of Diameters: This table represents various examples of what we can manufacture based on different diameters at a specific load. Options are not limited to the loads shown. Please contact Yale to discuss your specific application for custom designs.

ZipGrip Model	Min. Cable Diameter (mm)	Max. Working Load (5:1)		Color	Eye Size (Inches)	Cable Diameter (mm)	Installed Length		Unit Weight		Estimated Installation Time (min)	Estimated Removal Time (min)
		Lbs	Kg				Inches	(mm)	Lbs	Kg		
		Example										
7/16	64	6,800	3,070	Red	6	100	75	1,910	2.0	0.9	6	2
9/16	71	10,400	4,700	Blue	6	150	113	2,870	4.6	2.1	8	2
11/16	79	14,400	6,530	Green	6	200	151	3,820	8.1	3.7	9	2
7/8	102	19,800	9,000	Orange	8	250	188	4,780	18	8.2	11	3
1	119	31,000	14,070	Yellow	8	300	226	5,740	34	15	13	3
1-1/4	145	43,200	19,610	Black	12	350	263	6,690	59	27	16	4
1-1/2	168	67,600	30,670	Red	16	400	301	7,650	112	51	19	5
1-3/4	241	84,000	38,090	Blue	18	450	339	8,600	192	87	23	6
2	277	111,500	50,570	Green	18	500	376	9,560	299	136	26	7
2-1/4	343	159,000	72,140	Orange	20	600	452	11,470	539	244	34	9
2-1/2	384	192,000	87,110	Yellow	24	630	474	12,050	731	332	37	9

Additional Product Details: The primary closure system is a hybrid consisting of a Daisy Chain Loop and Lace System. A pure Daisy Chain closure is recommended if the ZipGrip is to be removed by ROV.

Synthetic Pulling & Stopping Grips

YaleGrips install easily on varying diameters.



The optional 6-leg YaleGrip will spread the load on the substrate more evenly.

The 6-legged YaleGrip is the best way to handle an umbilical as point compression loads are minimized.

The 6-leg grip has the same tensile rating as the 4-leg model but spreads the compressive forces more evenly across the surface. The

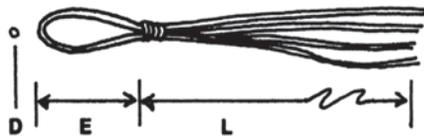
6-leg and the 4-leg are both available with optional Maxijacket marine coating.



Size the grip by anticipated loads, not by the cable size it fits. When the anticipated load needs to be spread over a wider surface area, a six-leg grip is suggested. Please call or email for a quotation.

YaleGrips are made from a Technora® Aramid fiber flat braid and are assembled in a 4-leg configuration extending from a reinforcing, securing eye. The eye is covered entirely with an extra layer of braid, which is saturated with Maxijacket urethane, an abrasion-resistant coating for extended life.

YaleGrips are used as pulling and stopping grips for electrical-line construction work above and below ground, for deployment and retrieval of a variety of cables, as marine stoppers on hawsers and for temporary or permanent strain relief. YaleGrips are applied quickly over a wide range of cable diameters without specialized tools. They are noncorrosive, have good dielectric properties and are compact and lightweight. Installed, the grip remains flexible and does less damage to mating surfaces than other types of grips.



Larger-sized cables may be accommodated by lengthening tail dimension ("L"). Please call or email for a quotation.

YaleGrips are far stronger than wire mesh grips and do not form dangerous "fishhooks," as do wire mesh grips, making them safer to handle.

YaleGrips may be used for temporary or permanent eyes, both in midspan or on the end.

Options include urethaning the entire grip, which extends the grip's life, especially useful in active towing applications. We call this the "marine treatment." We also can make a grip with extended tails to accommodate larger cables. Hardware can be added to the eye, such as stainless thimbles, which enhances performance.

To view an install, visit:

www.yalecordage.com/yalegrips



YaleGrips are available in all sizes shown below, each of which is color coded for easy identification. Each grip additionally carries a serialized tag for tracking purposes.

Specifications

Material Size		Part Number	Minimum Cable Diameter		Maximum Cable Diameter		Average Break Strength		Maximum Working Load (5:1)		Tail Length		Eye Size		Color
Inches	(mm)		Inches	(mm)	Inches	(mm)	Lbs	Kg	Lbs	Kg	Feet	M	Inches	(cm)	
7/16	(11)	944504T	3/16	(5)	1/2	(13)	6,000	2,722	1,200	544	4.5	1.4	6	(15)	Red
9/16	(14)	944505T	1/4	(6)	3/4	(18)	12,000	5,443	2,400	1,089	5.5	1.7	6	(15)	Blue
11/16	(17)	944506T	3/8	(10)	7/8	(22)	18,000	8,165	3,600	1,633	6.5	2.0	6	(15)	Green
7/8	(22)	944507T	1/2	(13)	1	(25)	30,000	13,608	6,000	2,722	8	2.4	8	(20)	Orange
1	(25)	944508T	5/8	(16)	1-1/8	(29)	48,000	21,773	9,600	4,355	10	3.0	8	(20)	Yellow
1-1/4	(32)	944509T	7/8	(22)	1-3/4	(44)	72,000	32,659	14,400	6,532	16	4.9	12	(30)	Black
1-1/2	(38)	944510T	1-1/8	(29)	3	(76)	120,000	54,432	24,000	10,886	22	6.7	16	(41)	Red
1-3/4	(44)	944511T	1-3/8	(35)	3-1/2	(89)	180,000	81,648	36,000	16,330	28	8.5	18	(46)	Blue
2	(51)	944512T	2	(51)	4	(102)	290,000	131,544	58,000	26,309	34	10.3	18	(46)	Green
2-1/4	(57)	944513T	3-1/4	(83)	5	(127)	365,000	165,564	73,000	33,113	40	12.2	20	(51)	Orange
2-1/2	(64)	944514T	4	(102)	6	(152)	450,000	204,120	90,000	40,824	52	15.8	24	(61)	Yellow

Eye/Eye & Endless Slings

All slings are rated 5:1



Eye/Eye Slings

Standard eye and eye sling for general-purpose work. Lightweight, very flexible, nonmarring and very strong.

Double Esterlon Eye/Eye Slings

Diameter		Vertical Ratings		Choker Ratings		Basket Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Inches	(cm)
3/8	(10)	1,120	505	896	405	2,240	1,015	34	(86)
7/16	(11)	1,440	650	1,152	520	2,880	1,305	38	(97)
1/2	(13)	2,160	980	1,728	780	4,320	1,960	42	(107)
5/8	(16)	3,400	1,540	2,720	1,230	6,800	3,085	53	(135)
3/4	(19)	4,160	1,885	3,328	1,510	8,320	3,775	60	(152)
7/8	(22)	6,200	2,810	4,960	2,250	12,400	5,625	68	(173)
1	(25)	8,800	3,995	7,040	3,195	17,600	7,990	78	(198)
1-1/4	(32)	11,560	5,245	9,248	4,195	23,120	10,495	102	(259)
1-1/2	(38)	15,240	6,915	12,192	5,535	30,480	13,835	120	(305)

Yalex Eye/Eye Slings

Diameter		Vertical Ratings		Choker Ratings		Basket Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Inches	(cm)
3/8	(10)	1,200	540	960	435	2,400	1,085	32	(81)
7/16	(11)	2,180	985	1,744	790	4,360	1,975	36	(91)
1/2	(13)	2,720	1,230	2,176	985	5,440	2,465	40	(102)
5/8	(16)	3,700	1,675	2,960	1,340	7,400	3,355	48	(122)
3/4	(19)	4,800	2,175	3,840	1,740	9,600	4,355	55	(140)
7/8	(22)	7,100	3,220	5,680	2,575	14,200	6,445	62	(157)
1	(25)	8,600	3,900	6,880	3,120	17,200	7,805	70	(178)

Vectrus Eye/Eye Slings

Diameter		Vertical Ratings		Choker Ratings		Basket Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Inches	(cm)
3/8	(10)	3,840	1,740	3,072	1,390	7,680	3,485	34	(86)
7/16	(11)	4,900	2,220	3,920	1,775	9,800	4,445	38	(97)
1/2	(13)	6,400	2,905	5,120	2,320	12,800	5,810	43	(109)
9/16	(14)	7,600	3,450	6,080	2,760	15,200	6,900	48	(122)
5/8	(16)	10,500	4,765	8,400	3,810	21,000	9,530	52	(132)
3/4	(19)	14,000	6,355	11,200	5,080	28,000	12,710	60	(152)
7/8	(22)	17,800	8,080	14,240	6,460	35,600	16,160	68	(173)
1	(25)	21,800	9,895	17,440	7,915	43,600	19,790	78	(198)



Endless Slings

A complete loop increases the lift capacity of a sling without going to a larger-diameter line. This sling makes an excellent choker with a wider "footprint" on the load for more positive control.

Double Esterlon Endless Slings

Diameter		Vertical Ratings		Choker Ratings		Basket Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Inches	(cm)
3/8	(10)	1,904	860	1,523	690	3,808	1,725	35	(89)
7/16	(11)	2,448	1,110	1,958	885	4,896	2,220	40	(102)
1/2	(13)	3,672	1,665	2,938	1,330	7,344	3,330	46	(117)
5/8	(16)	5,780	2,620	4,624	2,095	11,560	5,245	58	(147)
3/4	(19)	7,072	3,210	5,658	2,565	14,144	6,420	68	(173)
7/8	(22)	10,540	4,785	8,432	3,825	21,080	9,570	81	(206)
1	(25)	14,960	6,790	11,968	5,430	29,920	13,580	92	(234)
1-1/4	(32)	19,652	8,920	15,722	7,135	39,304	17,840	115	(292)
1-1/2	(38)	25,908	11,760	20,726	9,405	51,816	23,520	138	(350)

Yalex Endless Slings

Diameter		Vertical Ratings		Choker Ratings		Basket Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Inches	(cm)
3/8	(10)	2,040	925	1,632	740	4,080	1,850	20	(51)
7/16	(11)	3,706	1,680	2,965	1,345	7,412	3,365	23	(58)
1/2	(13)	4,624	2,095	3,699	1,675	9,248	4,195	26	(66)
5/8	(16)	6,290	2,855	5,032	2,280	12,580	5,710	32	(81)
3/4	(19)	8,160	3,700	6,528	2,960	16,320	7,405	39	(99)
7/8	(22)	12,070	5,475	9,656	4,380	24,140	10,955	45	(114)
1	(25)	14,620	6,635	11,696	5,305	29,240	13,270	52	(132)

Vectrus Endless Slings

Diameter		Vertical Ratings		Choker Ratings		Basket Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Inches	(cm)
3/8	(10)	6,144	2,785	4,915	2,230	12,288	5,575	38	(96)
7/16	(11)	7,840	3,555	6,272	2,845	15,680	7,115	44	(112)
1/2	(13)	10,240	4,645	8,192	3,715	20,480	9,295	51	(129)
9/16	(14)	12,160	5,520	9,728	4,415	24,320	11,040	57	(145)
5/8	(16)	16,800	7,625	13,440	6,100	33,600	15,250	64	(163)
3/4	(19)	22,400	10,165	17,920	8,135	44,800	20,335	72	(183)
7/8	(22)	28,480	12,925	22,784	10,340	56,960	25,855	86	(218)
1	(25)	34,880	15,835	27,904	12,665	69,760	31,670	97	(246)

Adjustable Slings



Adjustable Slings

Easily replaces a variety of different slings, accommodating different-sized loads. Infinitely adjustable.

PolyPlus Adjustable Slings

Diameter		Vertical Ratings		Choker Ratings		Basket Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Inches	(cm)
3/8	(9)	790	355	632	285	1,580	715	20	(51)
7/16	(11)	1,060	480	845	380	2,110	955	24	(61)
1/2	(13)	1,500	680	1,200	540	2,990	1,355	28	(71)
5/8	(16)	2,110	955	1,690	765	4,225	1,915	32	(81)
3/4	(19)	2,990	1,355	2,395	1,085	5,985	2,715	38	(97)

Yalex Adjustable Slings

Diameter		Vertical Ratings		Choker Ratings		Basket Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Inches	(cm)
3/8	(9)	1,056	475	845	380	2,112	955	20	(51)
7/16	(11)	1,918	870	1,535	695	3,837	1,740	24	(61)
1/2	(13)	2,394	1,085	1,915	865	4,787	2,170	26	(66)
5/8	(16)	3,256	1,475	2,605	1,180	6,512	2,955	32	(81)
3/4	(19)	4,224	1,915	3,379	1,530	8,448	3,835	38	(97)
7/8	(22)	6,248	2,835	4,998	2,265	12,496	5,670	46	(117)
1	(25)	7,568	3,435	6,054	2,745	15,136	6,870	52	(132)

Vectrus Adjustable Slings

Diameter		Vertical Ratings		Choker Ratings		Basket Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Lbs	Kg	Lbs	Kg	Inches	(cm)
3/8	(9)	3,072	1,390	2,458	1,115	6,144	2,785	34	(86)
7/16	(11)	3,920	1,775	3,136	1,420	7,840	3,555	38	(97)
1/2	(13)	5,120	2,320	4,096	1,855	10,240	4,645	43	(109)
9/16	(14)	6,080	2,760	4,864	2,205	12,160	5,520	48	(122)
5/8	(16)	8,400	3,810	6,720	3,050	16,800	7,625	52	(132)
3/4	(19)	11,200	5,080	8,960	4,065	22,400	10,165	60	(152)
7/8	(22)	14,240	6,460	11,392	5,170	28,480	12,925	68	(173)
1	(25)	17,440	7,915	13,952	6,330	34,880	15,835	78	(198)

4-Leg Adjustable Slings



Each leg adjusts to accommodate any-sized load or lift-point arrangement. Lifts using less than four legs reduce the ratings proportionately.

Note: 4-leg adjustable slings have a vertical rating based on four legs at 5:1. **All Rated Capacities (WLL's) on multiple-leg slings are based on EQUAL loading of all sling legs.**

PolyPlus 4-Leg Adjustable Slings

Diameter		Vertical Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Inches	(cm)
3/8	(9)	3,160	1,430	24	(61)
7/16	(11)	4,240	1,920	28	(71)
1/2	(13)	6,000	2,720	32	(81)
5/8	(16)	8,440	3,830	38	(96)
3/4	(19)	11,960	5,425	46	(117)

Yalex 4-Leg Adjustable Slings

Diameter		Vertical Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Inches	(cm)
3/8	(9)	4,220	1,915	24	(61)
7/16	(11)	7,674	3,480	28	(71)
1/2	(13)	9,574	4,345	32	(81)
5/8	(16)	12,820	5,820	38	(96)
3/4	(19)	16,900	7,670	46	(117)
7/8	(22)	25,000	11,350	52	(132)
1	(25)	30,280	13,745	60	(152)

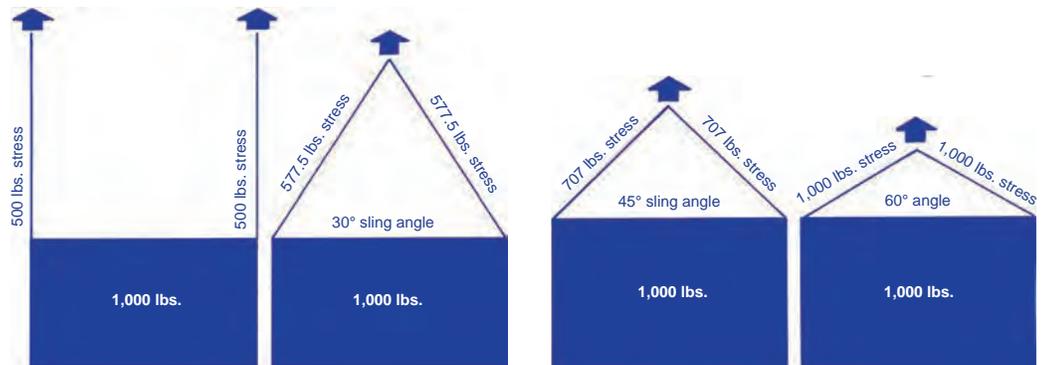
Vectrus 4-Leg Adjustable Slings

Diameter		Vertical Ratings		Minimum Length	
Inches	(mm)	Lbs	Kg	Inches	(cm)
3/8	(9)	12,288	5,575	30	(76)
7/16	(11)	15,680	7,115	33	(84)
1/2	(13)	20,480	9,295	36	(91)
9/16	(14)	24,320	11,040	37	(94)
5/8	(16)	33,600	15,250	57	(145)
3/4	(19)	44,800	20,335	67	(170)
7/8	(22)	56,960	25,855	76	(193)
1	(25)	69,760	31,670	90	(229)

Angle Effect: Sling Capacities

The capacity of a multiple-leg sling is directly affected by the angle of the sling leg with the vertical. As this angle increases, the stress on each leg increases. The capacity can be readily determined by multiplying the sling's vertical capacity by the appropriate load-angle factor.

Sling Angle	Load Angle Factor
Vertical	
0°	1.000
15°	0.966
30°	0.866
45°	0.707
60°	0.500
75°	0.259



Double Adjustable Transformer Sling



Optimus Sling

Optimus is the optimal solution for your lifting needs.

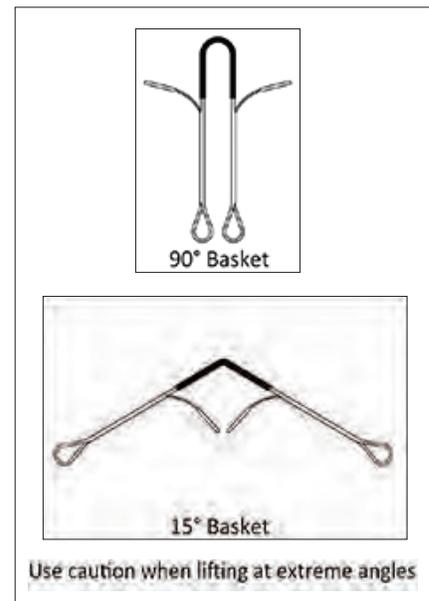
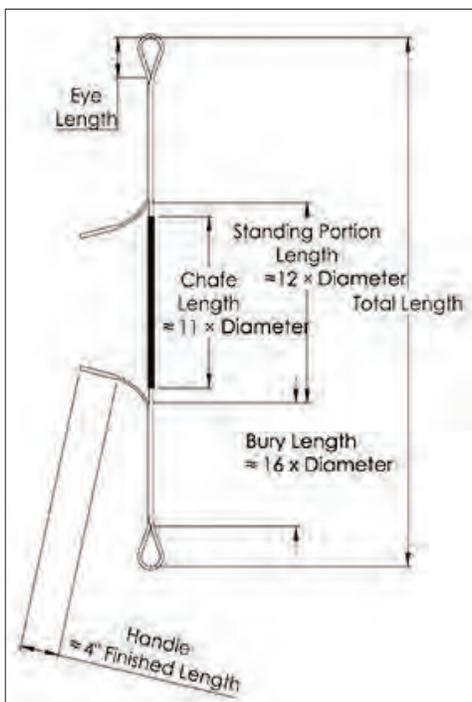
- Solution-dyed polyester, single braid
- Vibrant, colorfast fiber, resistant to fading
- Adjustable eyes on both ends
- Adapts to varying loads
- Infinite adjustability
- Weather and UV resistant
- Lightweight
- Treated with abrasion-resistant Maxijacket™ to extend service life
- Lifting portion protected by chafe sleeve
- Customized options available

Specifications

Diameter		Color	Minimum Length with 1-1/2" Eyes	Working Load Configurations Ratings in Pounds**					
Inches	(mm)			Vertical		Choker		Basket 15° *	
			Inches	Lbs	Kg	Lbs	Kg	Lbs	Kg
3/8	(10)	Neon Yellow	20	1,055	475	845	380	675	305
1/2	(13)	Neon Green	26	2,200	995	1,780	805	1,400	635
5/8	(16)	Orange	30	3,200	1,450	2,560	1,160	2,100	950
3/4	(19)	Blue	37	4,225	1,915	3,380	1,530	2,700	1,225
7/8	(22)	Green	43	6,250	2,835	5,000	2,270	4,000	1,815

* Use caution when lifting at extreme angles.

** Working load is based on static or moderately dynamic lifting/pulling operations. Instantaneous changes in load, up or down, in excess of 10% of the rope's rated working load constitute hazardous shock load and would void the normal working-load recommendation. Consult Yale Cordage for guidelines for working loads and the safe use of rope.



Navy RIB Boat Slings

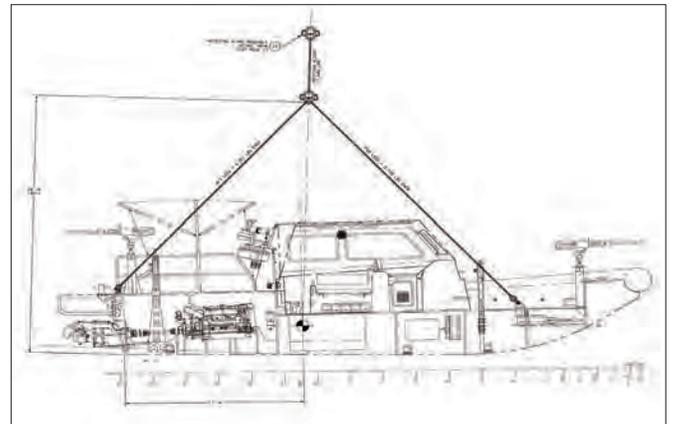
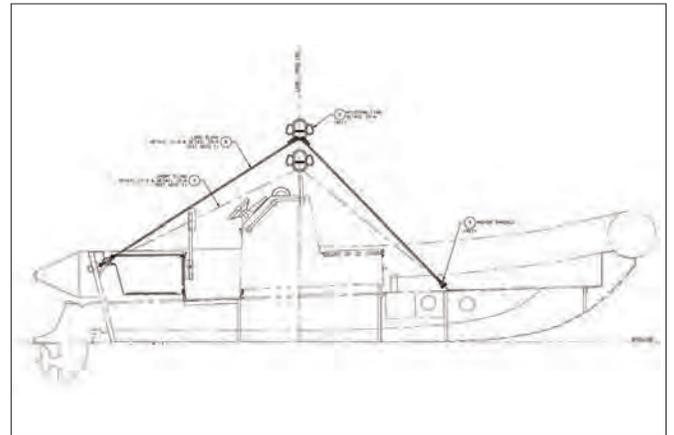
Our Navy RIB Boat Slings were developed in conjunction with NSW Carderock Division to handle RIB Boats. The initial goal was to eliminate wire rope from existing slings, reducing electronic interference, corrosion, wire fish hooks, and generally engineering a safer system.

The results are slings made with our Aracom T double braid rope consisting of a Technora® Aramid core and a high-tenacity polyester sleeve. It is then coated with our battleship gray Maxijacket urethane coating for added abrasion resistance. The hardware used in these assemblies are designed with ease of handling in mind and are tested and certified.

These slings are available as 11M RIB boat slings and 4-Leg RIB boat slings. Our most popular sizes and constructions include:

- 11m Cabin Boat Sling 7/8" Aramid
- 11m Open Boat Sling 7/8" Aramid
- 11m NSW Boat Sling 7/8" Aramid
- 5.4m Rib Boat Sling - 3/8" Aramid
- 7m Rib Boat Short Sling - 5/8" Aramid
- 7m Rib Boat Long Sling - 5/8" Aramid

Other styles of boat slings are available – please contact us for more details.



Cable Joiners & Pulling Eyes

TechEye2 and TechJoin2 are used for terminating or joining Yale's Unitrex XS parallel-core cables. Each strand of the structure is an individual Technora® braid.

TechEye3 and TechJoin3 are used for terminating or joining Yale's Uniline parallel-core cables. Each strand of the structure is a blend of Technora® and colored polyester braid.

Both are coated with our Maxijacket High Performance coating for

50% more abrasion resistance. Both are easily applied and supplied with the required assembly tools.

Test thoroughly for suitability before using in a real-world situation with any ropes other than the Yale ropes specified for each product.



Yale TechEye2

Custom designed to be used with our Unitrex XS product. Preassembled high-modulus synthetic alternative to eye splicing.



Yale TechJoin2

Custom designed to be used with our Unitrex XS product. Preassembled high-modulus, end-for-end rope joiners.



Yale TechEye3

Custom designed to be used with our Uniline product. Preassembled high-modulus synthetic alternative to eye splicing.



Yale TechJoin3

Custom designed to be used with our Uniline product. Preassembled high-modulus, end-for-end rope joiners.



Specifications

Part Number	UNITREX Size Range		Color	Length		Working Load		Weight	
	Inches	(mm)		Feet	Meters	Lbs	Kg	Lbs	Kg
940TE10	0.44	(11)	Red	8	2.4	5,000	2,268	1	0.45
940TE15	0.53	(13)	Yellow	9.5	2.8	6,600	2,993	1.5	0.68
940TE20	0.58	(15)	Blue	10.5	3.2	9,000	4,082	2	0.9
940TE25	0.63	(16)	Orange	11	3.4	10,625	4,819	3	1.4
940TE30	0.71	(18)	Green	13	4.0	12,700	5,761	4	1.8
940TE35	0.84	(21)	Red	14	4.3	18,500	8,391	7	3.2
940TE40	1	(25)	Yellow	17	5.2	25,000	11,340	9	4.1
940TE45	1.15-1.25	(29-32)	Blue	22	6.7	39,500	17,917	13	5.9
940TE50	1.40	(36)	Orange	26	7.9	49,000	22,225	19	8.6

Part Number	UNITREX Size Range		Color	Length		Working Load		Weight	
	Inches	(mm)		Feet	Meter	Lbs	Kg	Lbs	Kg
940TJ10	0.44	(11)	Red	16	4.9	5,000	2,268	2	0.9
940TJ15	0.53	(13)	Yellow	19	5.8	6,600	2,993	3	1.4
940TJ20	0.58	(15)	Blue	21	6.4	9,000	4,082	4	1.8
940TJ25	0.63	(16)	Orange	22	6.7	10,625	4,819	6	2.7
940TJ30	0.71	(18)	Green	26	7.9	12,700	5,761	8	3.6
940TJ35	0.84	(21)	Red	28	8.5	18,500	8,391	14	6.4
940TJ40	1.00	(25)	Yellow	34	10.4	25,000	11,340	19	8.6
940TJ45	1.15-1.25	(29-32)	Blue	44	13.4	39,500	17,917	26	11.8
940TJ50	1.40	(36)	Orange	52	15.8	49,000	22,225	38	17.2

Part Number	UNILINE Size Range		Color	Length		Working Load		Weight	
	Inches	(mm)		Feet	Meters	Lbs	Kg	Lbs	Kg
94032TEU	1/2	(13)	Red/Gold	6	1.8	2,625	1,191	0.6	0.3
94040TEU	5/8	(16)	Green/Gold	7.5	2.3	4,300	1,951	1.2	0.5
94048TEU	3/4	(19)	Orange/Gold	8.6	2.6	6,050	2,746	2.0	0.9
94056TEU	7/8	(22)	Blue/Gold	10	3.0	8,200	3,723	3.1	1.4
94064TEU	1	(25)	Purple/Gold	11.5	3.5	10,550	4,789	4.4	2.0

Part Number	UNILINE Size Range		Color	Length		Working Load		Weight	
	Inches	(mm)		Feet	Meters	Lbs	Kg	Lbs	Kg
94032TJU	1/2	(13)	Red/Gold	11	3.4	2,625	1,191	1.1	0.5
94040TJU	5/8	(16)	Green/Gold	14	4.3	4,300	1,951	2.2	1.0
94048TJU	3/4	(19)	Orange/Gold	16	4.9	6,050	2,746	3.7	1.7
94056TJU	7/8	(22)	Blue/Gold	19	5.8	8,200	3,723	5.8	2.6
94064TJU	1	(25)	Purple/Gold	22	6.7	10,550	4,789	8.3	3.8

Synthetic Shackle/Tandem Stopper Assembly



Synthetic Shackle

The Synthetic Shackle is made from our Ultrex 12-strand Ultra High Molecular Weight Polyethylene UHMWPE fiber and is Maxijacket High Performance coated for structural

firmness and increased abrasion resistance. It is lightweight and offers a quick connection with no tools required.

Specifications



*Open length of the shackle describes the length as shown in the image above, omitting the knot.

Diameter		Minimum Open Length*	Minimum Increment	Knot Diameter	Maximum Diameter**	Average Break Strength	Work Load 5:1
Inches	(mm)	Inches	Inches	Inches	Inches	Lbs	Lbs
1/4	(6)	7	2	1.1	1.2	11,200	2,240
5/16	(8)	9	2	1.4	1.5	23,000	4,600
3/8	(10)	11	2	1.7	1.8	34,000	6,800
7/16	(11)	12	4	2.0	2.0	43,700	8,740
1/2	(13)	14	4	2.2	2.5	63,600	12,720
9/16	(14)	16	4	2.5	2.8	76,500	15,300
5/8	(16)	18	4	2.8	3.1	90,100	18,020
3/4	(19)	21	6	3.4	3.8	127,500	25,500
7/8	(22)	25	6	4.0	4.4	166,600	33,320
1	(25)	28	6	4.5	5.0	204,000	40,800
1-1/8	(29)	32	6	5.0	5.5	251,600	50,320
1-1/4	(32)	35	8	5.7	6.0	292,400	58,480
1-1/2	(38)	43	8	6.8	7.2	391,000	78,200
1-5/8	(41)	47	8	7.5	8.0	484,500	96,900
2	(51)	57	8	9.0	9.5	663,000	132,600

Larger sizes available, contact Yale for details.

** Maximum diameter indicates the diameter of an object that the shackle can be closed around. Values represented are based on the minimum open lengths shown.



Tandem Stopper Assembly

An appropriately sized Tandem Stopper Assembly is the only recommended midspan termination technique for Unitrex. When properly configured, it is rated to the full working load of the underlying Unitrex (see load rating table below). Other conventional termination devices/techniques have been demonstrated to cause an unacceptable amount of damage to Unitrex when tested.

The Tandem Stopper Assembly will be packaged to include all necessary materials and hardware for installation, including a single shackle matched to the total assembly working load. This shackle provides the best possible attachment point to the connecting sling, allowing the load to be evenly shared between the two applied Stoppers.

Unitrex Diameter		Working Load	
Inches	(mm)	Lbs	Kg
0.44	(11)	5,000	2,268
0.53	(13)	6,500	2,948
0.58	(15)	8,500	3,856
0.63	(16)	10,625	4,819
0.71	(18)	12,625	5,727
0.84	(21)	18,375	8,335
1.00	(25)	25,000	11,340
1.15	(29)	31,250	14,175

Chafe Sleeve



Yale Coat Chafe

Yale Coat Chafe is a braided-polyester inner-lining material allowing for a smooth application while the outer heavy-duty layer of

abrasion-resistant urethane provides protection against wear surfaces. This construction allows for continued flexibility in cold climates.

Specifications

Rope Diameter	Inside Diameter	Outside Diameter	Weight
Inches	Inches	Inches	Foot/Lbs.
3/4	0.84	1.23	0.14
1	1.05	1.44	0.20
1-1/4	1.31	1.70	0.27
1-1/2	1.66	2.05	0.30
1-3/4	1.90	2.29	0.34
2-1/4	2.38	2.88	0.46
2-3/4	2.88	3.38	0.49

Yale Coat Chafe Small Eye Protection Sleeve

(approximately sized to heavy duty thimble)



Rope Diameter	Inside Diameter	Outside Diameter	Weight	Eye Width	Eye Length
Inches	Inches	Inches	Unit/Lbs.	Inches	Inches
3/4	0.84	1.23	0.20	2.25	4.25
1	1.05	1.44	0.34	2.88	5.12
1-1/4	1.31	1.70	0.55	3.5	6.5
1-1/2	1.66	2.05	0.77	4	8
1-3/4	1.90	2.29	1.50	6	12
2-1/4	2.38	2.88	2.32	7	14
2-3/4	2.88	3.38	2.99	8	15.5

Yale Coat Chafe Towing Eye Protection Sleeve



Rope Diameter	Inside Diameter	Outside Diameter	Weight	Eye Width	Eye Length
Inches	Inches	Inches	Unit/Lbs.	Inches	Inches
3/4	0.84	1.23	0.60	12	36
1	1.05	1.44	0.87	12	36
1-1/4	1.31	1.70	1.10	12	36
1-1/2	1.66	2.05	1.28	12	36
1-3/4	1.90	2.29	2.18	16	48
2-1/4	2.38	2.88	2.93	16	48
2-3/4	2.88	3.38	3.45	16	48

Tubular Chafe Protection Sleeve

It is a tightly woven Cordura Black ballistic nylon sleeve that is solution dyed to minimize color fading. It's highly wear resistant while maintaining flexibility in use. Note that the sizing for straight rope coverage is larger than for soft eyes to accommodate for the increased rope diameter in the splice section and allow full protection up to the spliced eye. Sleeve size is based for best coverage fit to rope diameter separately for: soft eyes and on standing rope and splice area.



Sleeve Size/ Part Number	Soft Eye Coverage for Rope Diameter	Rope Coverage for Rope Diameter
10019009	1/2", 9/16"	1/2"
10019010	5/8", 3/4"	9/16"
10019011	7/8"	5/8"
10019012	1"	3/4"
10019013	-	7/8"
10019014	1-1/8", 1-1/4"	1", 1-1/8", 1-1/4"

Larger sizes available

Coatings



Red



Blue



Green



Yellow



Orange



Black



Gray



Clear

Yale Maxijacket

This is a spliceable urethane coating that is applied after the rope is braided. Maxijacket firms the rope, increases snag resistance, improves abrasion resistance and helps keep contaminants from entering the rope. Unlimited lengths may be processed at our facility through our automated coaters, which apply and control the polymer penetration, curing the coating at precisely controlled temperatures. Maxijacket maintains the rope's splicing characteristics and is available in a range of colors for rapid line identification. The colors are also useful to track time in service, to color code for load rating, for phase identification or to make the rope more visible.

Maxijacket by the quart or gallon

A water-based urethane, premixed with color pigment for hand application.

Available Colors: Red, Blue, Green, Yellow, Orange, Black, Gray and Clear

All colors available in quart or gallon sizes.

Shipping Weights:

Quart: 2.5 lbs.

Gallon: 9.5 lbs.

High-Performance Maxijacket (HP)

Maxijacket HP is a new urethane technology originating in Europe. It brings an innovative toughness to our high-modulus rope offerings. This new material is harder, penetrates better and is twice as abrasion resistant as our traditional Maxijacket coating. Maxijacket HP is available in the same color choices as our Maxijacket offering. It is applied as the standard coating of choice on all high-modulus single braids and can be requested as a special-order option on any other products.

Available Colors: Red, Blue, Green, Yellow, Orange, Black, Gray and Clear

All colors are available in quart or gallon sizes.

Shipping Weights:

Quart: 2.5 lbs.

Gallon: 9.5 lbs.

Splicing & Labeling

Yale Qualified Splicer Program

Yale Cordage recognizes its products are regularly fabricated by authorized stocking distributors. We want to ensure the splices performed are of the highest quality and conform to our standard methods. We offer the Yale Qualified Splicer Program as a tool to ensure that your riggers are performing their work correctly.

Yale Qualified Splicers have completed an appropriate Yale Qualified Splicer Program Kit. There are several kits available upon request. These kits include instructions on proper splicing techniques and materials on which to perform a test splice. When a rigger returns a completed test splice to Yale Cordage, our Engineering department breaks the splice and evaluates it. If it tests satisfactorily, the rigger will be issued a certificate stating completion of training and qualification to splice Yale Cordage products. This is all included in the price of the training kit.

It is important to be aware that the certificate states that a rigger is trained and qualified in splicing Yale Cordage products only. For liability purposes, this certification does not cover or apply to other brands of rope. Yale splicer certificates must be renewed annually.



Labeling

All of Yale's rigged products come with a serialized tag showing product and/or lift capacities. This durable tag provides immediate identification of the item and its source. A tag also can be valuable in determining if the right product is being used for the applications for which it is intended.

Etiflex

Etiflex Tags are designed and made with superior durability and abrasion resistance to ensure the labels can always be read in compliance with OSHA. The information is molded onto the high-visibility, two-color tag with excellent UV resistance for readability in all industrial environments.



Please visit our website for product-specific splicing techniques.

S•P•L•I•C•E•R Methods

A complete set of Yale splice instructions is available for purchase.

S•P•L•I•C•E•R Instruction and Training Aids

This package consists of fid, fid pusher, rope and illustrated splicing instructions. These training aids are excellent for safety programs, beginner classes or refresher courses. Splices shown are for industrial applications involving lifting/hoisting/construction ropes. Kits are available for double and single braids.

Professional Splicing Kit

- 10 tubular fids: 1 each of 1/4"–1" diameter size
- 2 pushers: 1 small and 1 large size
- 1 pair of 7-inch cutting shears
- 3 lock stitching needles: 1 small "A," 1 medium "B," and 1 large "C"

The splicing kit is packaged in a compartmented, roll-up fabric storage pouch, as shown below.



Splicing Tools

Tubular aluminum fids, Swedish fids, fid pushers, palms, cutting shears, stitching needles, whipping twines and numerous splicing videos and DVDs, are available for individual purchase.

Choosing a Rope:

Always consult the manufacturer before using rope when personal safety or possible danger to property is involved. Make sure the rope is adequate for the job. Do not use rope that is too small or the wrong type.

Product	Strength Scale 1-5 (5 = strongest, diameter to diameter)	Elastic Elongation at Working Load %	Weight Scale 1-5 (5 = heaviest, diameter to diameter)	Working Energy Absorption Ft Lbs/Lb of Rope	Maximum Energy Absorption Ft Lbs/Lb of Rope	Rope Average Specific Gravity g/cc	Splice Complexity Scale 1-5 (5 = most complex)	Dielectric Leakage, New/Dry, at 100 kV AC, 2ft. Spacing, in Micro-Amperes*** (250 Max allowable)
Aracom Miniline	2.9	0.6	4.0	100	4,906	1.40	5	NA
Aracom T	3.1	0.7	4.4	157	4,409	1.40	3	NA
Aracom 100	3.8	0.9	3.9	426	8,144	1.44	1	<250
Crystalyne	2.7	0.5	4.3	187	3,403	1.40	3	<100
Double Esterlon	1.4	2.2	3.9	291	7,711	1.38	2	<20
Hy-Dee Brait	0.7	2.7	2.8	116	12,673	0.93	3*	<10
Kernmaster	1.2	6.2	3.8	622	9,775	1.23	3	>500
Lugger Line	1.0	2.2	2.4	330	11,400	0.95	1	<100
Maxibraid	3.5	0.7	3.3	226	6,342	0.97	1	<100
Maxibraid Plus	2.7	0.6	3.7	115	4,295	1.18	3	<100
Mega Max	2.9	0.5	2.7	318	8,300	0.97	3	<100
Nylon Brait	1.3	10.0	2.9	1,426	23,680	1.14	3	NA
Oceanographer's Brait	1.3	17.5	2.9	2,739****	26,074	1.14	3	NA
Optimus ROPE	1.8	3.5	4.6	351	9,915	1.38	1	<100
PE-12	1.7	3.0	4.3	406	8,738	1.38	1	<100
Phantom-12	1.3	1.0	2.3	212	4,521	1.40	1	NA
Polydyne	1.5	5.1	3.8	576	11,187	1.24	2	>500
PolyPlus Braid	1.1	3.4	3.1	395	8,228	1.25	1	<100
Portland Braid	1.3	2.0	4.0	265	5,929	1.38	2	<20
Shark Byte 12	1.2	1.2	2.2	296	3,884	1.10	1	NA
Shark Byte 8	0.4	3.3	2.7	478	10,365	1.14	3	NA
SP-12	2.1	1.1	3.9	292	5,851	1.12	1	<100
Tech-Kern	2.8	0.7	3.8	233	4,571	1.44	3	NA
Ultrex Plus	2.9	0.5	3.7	140	5,428	1.18	3	<100
Ultrex	5.0	0.6	3.1	318	8,300	0.97	1	<100
Uniline	1.4	3.5	5.0	262	5,230	1.38	5	<50
Unitrex XS 8	3.5	0.5	4.6	NA	NA	1.10	4	<50
Unitrex XS Max Wear	3.5	0.5	4.6	247	6,893	1.10	5	<50
Vectrus	4.3	0.6	3.8	232	4,446	1.40	1	<100
Yalex	1.7	3.0	4.5	409	10,700	1.38	1	<100
Yalon	1.1	7.0	3.5	796	11,871	1.14	2	>2000

* Quick splice method available which reduces the break strength but also reduces the splice complexity to 1

** NA in Dielectric leakage indicates that the product is not recommended for use in dielectric situations due to the ropes potential moisture gain

***Absorbed or entrained moisture or impurities will increase a ropes conductivity dramatically

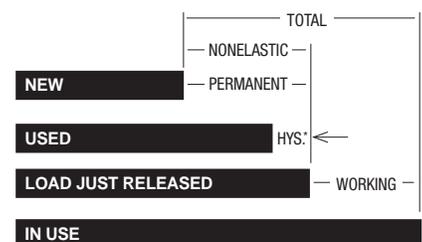
**** Oceanographers energy absorption is at a WL of 30%

Fiber

Comparison Data

	Strength Scale 1-5	Tenacity g/d	Specific Gravity g/cc	Weight Scale 1-5	Average Water Absorption % @65% RH	Melting Point °F (°C)	Elastic Elongation Scale 1-5
Nylon (NY)	1.5	9.2	1.14	2.5	5.0	460 (240)	5
Polyester (PET)	1.4	9.2	1.38	4.3	0.4	480 (255)	3
Polypropylene (PP), Polyethylene (PE)	1.0	6.5	0.93	1.0	0.0	330 (165)	4
Co-Polymer (PP/PE)	1.1	7.5	0.93	1.0	0.0	330 (165)	3
UHMWPE*	4.8	36.0	0.97	1.3	0.0	300 (150)	1
Aramid (Technora, Twaron, Kevlar)	3.8	28.0	1.44	4.8	4.0	**900 (500)	2
Vectran (LCP)	3.9	28.0	1.40	4.4	0.0	625 (330)	1
Zylon PBO	5.0	45.0	1.56	5.0	1.3	***1200 (650)	1

Components of Elongation



* Hysteresis refers to a recoverable portion of stretch over a period of time after a load is released.

* High Modulus Polyethylene

** Chars

*** Decomposition temperature

For computing energy-absorption requirements, refer to example in "Dynamic Loading."

For computing weight in sea water: (Wt. in Air) - (Wt. in Air)(1.03) / (Specific Gravity of Rope)

For more information visit our website to view
Rope Care & Inspection Guide at www.yalecordage.com/inspection-guide

Storage and Care

All rope should be stored clean, dry, out of direct sunlight and away from extreme heat. Some synthetic rope may be severely weakened by prolonged exposure to ultraviolet (UV) rays, unless specifically stabilized and/or pigmented to increase its UV resistance. UV degradation is indicated by discoloration and the presence of splinters and slivers on the surface of the rope. To properly unreel rope, a shaft should be inserted through the center of the reel, and the rope should be pulled off the top while the reel is free to rotate.

Reverse rope ends regularly to promote even wear and assure a longer life. Apply a steady, even pull to achieve full strength from rope or synthetic cable. Formulas to determine reel and storage capacities (use inch reel dimensions):

$$\text{Rope length} = \frac{(\text{traverse width}) (\text{flange diameter}^2 - \text{barrel diameter}^2)}{\text{feet} \quad (16) (\text{rope diameter}^2)}$$

Formulas to determine bin capacity: $V=(C)^2 \times (L) \times (R)$

V = volume in cubic inches

C = rope circumference in inches

L = length of rope in feet

R = 1.58 for carefully stored rope or 2.0 for random packing

CAUTIONS

Overloading and Use of Working Loads

Because of the wide range of rope use, 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.

A higher working load may be selected only with expert knowledge of conditions and professional estimate of risk, and if the rope has not been subject to dynamic loading or other excessive use; if the rope has been inspected and found to be in good condition, and is to be used in the recommended manner; and if the applications do not involve elevated temperatures, extended periods under load or obvious dynamic loading, such as sudden drops, snubs or pickups. For all such applications, consult Yale.

Many uses of rope involve serious risk of injury to personnel or damage to valuable property. ***This danger is often obvious, as when a heavy load is supported above one or more workers. An equally dangerous situation occurs if personnel are in line with a rope under tension. Should the rope fail, it may recoil with lethal force. Persons should be warned against the serious danger of standing in line with any rope under tension.***

In all cases where such risks are present, or there is any question about the loads involved or the conditions of use, the working load should be substantially reduced.

Minimum breaking strength is based on test data of new, unused rope and is a value not greater than two standard deviations below the mean.

Dynamic Loading Voids Normal Working Load

Normal working loads are not applicable when rope is subject to significant dynamic loading. Instantaneous changes in load, up or down, in excess of 10% of the line's rated working load constitute hazardous shock load and would void the normal working loads.

Whenever a load is picked up, stopped or swung, there is an increased force due to such dynamic loading. The more rapidly actions occur, the greater the increase will be. In extreme cases, the force put on the rope may be two, three or even more times the normal load involved and may result in the rope parting. Examples could be picking up a tow on a slack line or using a rope to stop a falling object. Therefore, in all dynamic applications, working loads as given do not apply.

Users should be aware that dynamic effects are greater on a low-elongation, high-modulus rope such as Aramid and lesser on a higher-elongation, nylon-based product. Dynamic effects are greater on a shorter rope than on a longer one. The working load ratios listed contain provision for very modest dynamic loads. This means, however, that when the working load has been used to select a rope, the load must be handled slowly and smoothly to minimize effect and avoid exceeding provision for it.

Example:

A load of 3,500 lbs is being lowered using 5/8" diameter Double Esterlon, which has a maximum recommended working load of 3,400 lbs. With 15 feet of line in tension, the line accidentally slips, dropping the load 1 foot before arresting the fall.

Question: How much energy did the rope have to absorb, and has the rope been overloaded or damaged?

Work done (ft lbs): (weight)(length of fall) = 3,500 ft lbs

Rated maximum working energy absorption

Capacity = (weight of the rope in use)(working energy absorption capacity rating for the rope used)

From the data page, Double Esterlon has a working energy-absorption capacity of 291 ft lbs per pound of rope and a weight of 13.7 lbs per 100 ft or 0.137 lbs/ft

Rated maximum working energy-absorption capacity of 16 feet of 5/8" Double Esterlon = (16 ft)(0.137 lbs/ft)(291 ft lbs/lb) = 638 ft lbs.

In this example, 2.19 lbs of rope (16 ft x 0.137 lbs/ft) in use must absorb 3,500 ft lbs: or $3,500 \div 2.19$ lbs equals 1,596 ft lbs/lb of rope.

In this example, the maximum working energy-absorption capacity has been exceeded by nearly six (6) times. The effect is to drive the max. load the rope encounters until it arrests the load or breaks.

Rated ultimate energy absorption of 16 feet of 5/8" Double Esterlon = (16 ft)(0.137 lbs/ft) (7,711 ft lbs/lb) = 16,902 ft lbs, and any dynamic load exceeding this total would break the line. Note that there is a linear relationship between the weight of the rope in tension versus its energy-absorption capability. In the above example, some degree of the rope's integrity has been compromised, and prudent safety practice would call for downgrading or discarding the line.

A short film on this subject may be accessed through our website: www.yalecordage.com/videos.

Abrasion: Avoid all abrasive situations. Rope can be severely damaged if subjected to rough surfaces or sharp edges. Chocks, bits, winches, drums and other surfaces must be kept in good condition and free of burrs and rust. Sheaves must be free to rotate and should be of proper size to avoid excessive wear. Clamps and similar devices will damage and weaken the rope and should be

used with extreme caution. Do not drag rope over rough ground. Dirt and grit picked up by rope can work into the strands, cutting the inside fibers and reducing the rope's strength.

Chemicals: Avoid chemical exposure, as rope is apt to be damaged. Consult Yale for recommendations when a rope will be used where chemical exposure can occur.

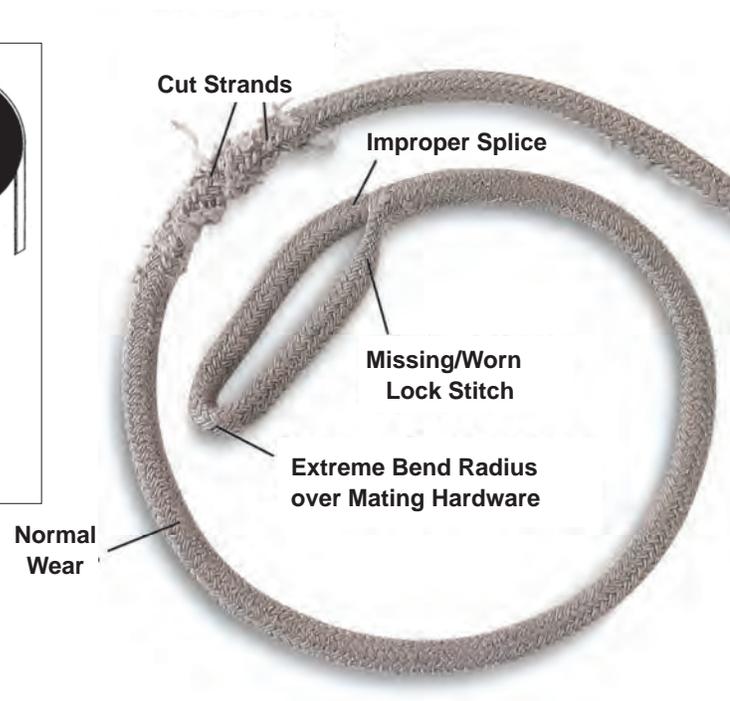
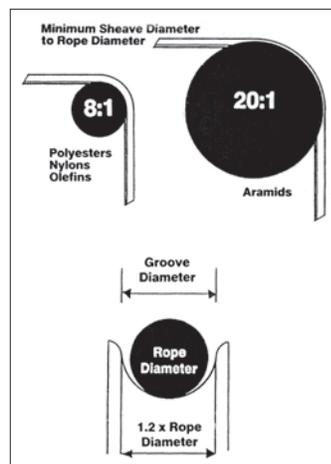
Temperature: The tensile strength charts apply to ropes tested at normal room temperature (70°F). Ropes have lower tensile strengths at higher temperatures. Continued exposure at elevated temperatures can melt and part synthetic ropes or cause permanent damage.

Dielectric Strength, as shown in the catalog, is offered as a guideline to help you compare various fibers and constructions. We recommend that you consider all ropes, regardless of their initial new rated dielectric strength, as conductive in service. A short video on our highest dielectric rope, Hy-Dee, is available via our website: www.yalecordage.com/videos.

Splicing: Join rope by splicing. Use Yale's recommended splices for maximum efficiency. The strengths shown in this catalog are for spliced lengths. Other terminations can be used, but their strength loss with a particular type of rope and construction should be determined and not assumed.

Knots and abrupt bends significantly reduce the strength of all ropes and lower the maximum working load.

Avoid using rope that shows signs of aging and wear. If there is any question, destroy the used rope. No type of visual inspection can be guaranteed to accurately and precisely determine actual residual strength. When the fibers show wear in any given area, the rope should be respliced, eliminating the damaged area; downgraded; or replaced. Check the line regularly for frayed strands and broken yarn. Pulled strands should be rethreaded into the rope if possible. A pulled strand can snag during a rope operation. Both the outer and inner rope fibers contribute to the strength of rope. When either is worn, or the rope is compacted or hard, this indicates reduced strength. The dielectric strength of rope in this condition is also reduced.



Inspection Our website provides a detailed inspection guide showing the common inspection scenarios by rope type as shown below.

Single Braid

Protruding Strand



THE REPAIR: Work the strand back into the rope as soon as you notice it, by carefully tugging on adjacent strands until the excess is distributed evenly. A protruding strand in service could easily snag or break, causing further complications.

Abrasion



THE REPAIR: There isn't a repair for abrasion, but you should still inspect for it. If the strength loss is minimal, go ahead and continue use. If the strength loss is moderate, consult Yale or retire the rope. If it's excessive, always retire.

Melting or Glazing



THE REPAIR: If possible, remove the affected section and re-splice with an end-for-end splice. Otherwise – or if you suspect the rope has experienced shock loading – retire the rope.

Cut Strand



THE REPAIR: If possible, remove the affected section and re-splice with an end-for-end splice. If re-splicing is not possible, retire the rope. As a general rule, 12-strand ropes should be retired when more than three broken strands are visible.

Diameter Change



THE REPAIR: If the diameter is reduced by less than 10 percent, it is still able to remain in service. If the diameter reduction is 11–20 percent, downgrade the rope. Should the diameter reduction from new to used exceed 20 percent, retire the rope.

Incorrect End-to-End Splice



THE REPAIR: Re-splice the rope correctly.

Balanced Double Braid

Protruding Strand



THE REPAIR: One to four strands spaced out by several feet can be removed and rewoven into the line with minimal impact on strength (less than 12 percent).

Deeply Abraded Spot



THE REPAIR: If you encounter a deeply abraded spot, where more than 50 percent of the strand is affected, you can re-splice the rope to repair it.

Worn-Out Eye

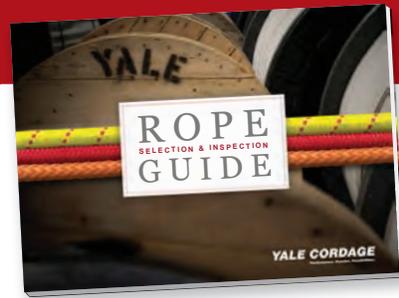


THE REPAIR: To repair a worn-out eye, you'll want to shorten, re-splice and reverse the rope. Proceed by putting the unused end into service.

Discontinuity In Rope Diameter



THE REPAIR: Open the rope sleeve to remove and inspect the core. If the core is parted, you will need to retire the rope.



Go to <http://www.yalecordage.com/pdf/Rope-Inspection-and-Selection-Guide.pdf> to learn more about causes and repairs.

High-Modulus Double Braid

Flat Spot Inside Rope



THE REPAIR: Open the rope sleeve to remove and inspect the core. If the core is parted, you will need to retire the rope.

Bumps On Cover



THE REPAIR: This rope can be returned to service. Simply flex the rope to remove the compression.

Cut Strand



THE REPAIR: As long as the core remains covered, you can repair cut strands by whipping into place, without impact on the strength.

8-Strand Plaited

Abraded Spot



THE REPAIR: If you encounter an abraded spot with excessive damage, you can cut out and re-splice the section.

Cut Strand



THE REPAIR: If possible, remove the affected section and re-splice with an end-for-end splice. If re-splicing is not possible, retire the rope.

Braid Lay Length Change



THE REPAIR: If permanent deformation results in a longer lay length in excess of 15 percent, retire the line.

Parallel Core

Protruding Strand



THE REPAIR: To repair a protruding strand on a parallel core rope, you'll need to cut off excess strand, execute a careful heat seal and whip with twine.

Abrasion



Abraded spot



Deep abrasions through the rubber but not into the core



Deep abrasions through the rubber and damaging the core

THE REPAIR: To repair an abraded spot, evaluate the depth of the abrasion. If the rubber jacket is not compromised, whip and return to service. If you notice deep abrasions through the rubber but not into the core, you can repair the rubber layer and then whip the area. Abrasions and cuts through the rubber layer and damaging the core should be cut out and repaired with TechJoin.™



77 Industrial Park Road
Saco, Maine 04072
Tel: 207-282-3396
Fax: 207-282-4620
www.yalecordage.com

**YALE CORDAGE
ALSO MANUFACTURES
ROPES FOR:**

- Arborists
- Pleasure Marine
- Custom Fabrications
to Your Blueprints
- Electromechanical
Cables
- Mining

YALE CORDAGE

Performance. Passion. Possibilities.