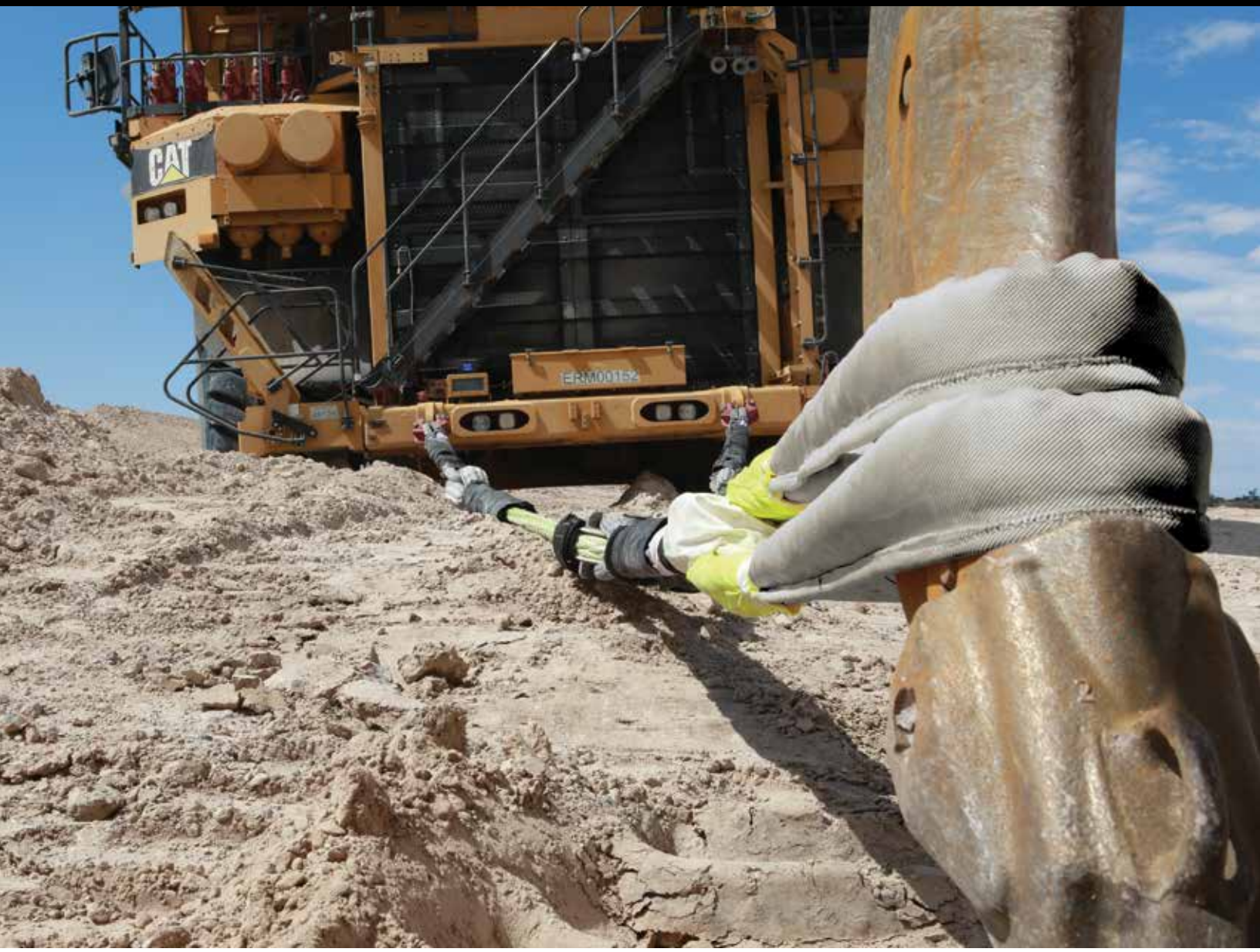
Mining

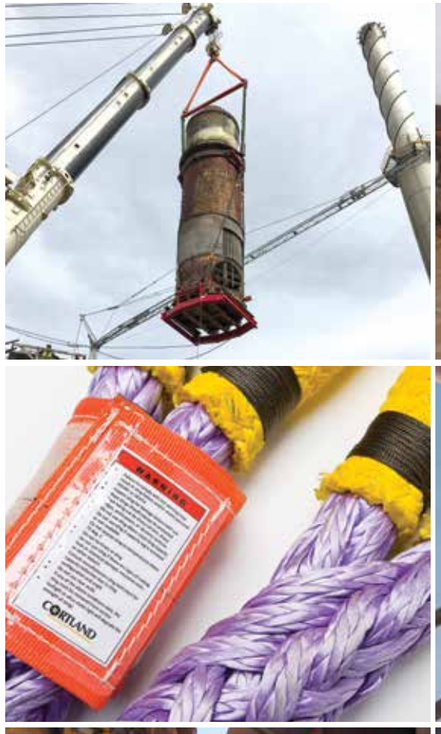
Recovery and Towing, Lifting, and Winching Solutions

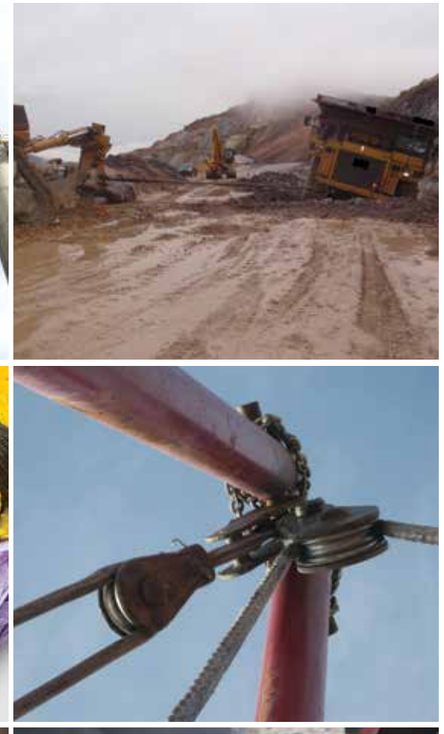


CORTLAND™
A CORTLAND INTERNATIONAL COMPANY

When Safety and Productivity Matter









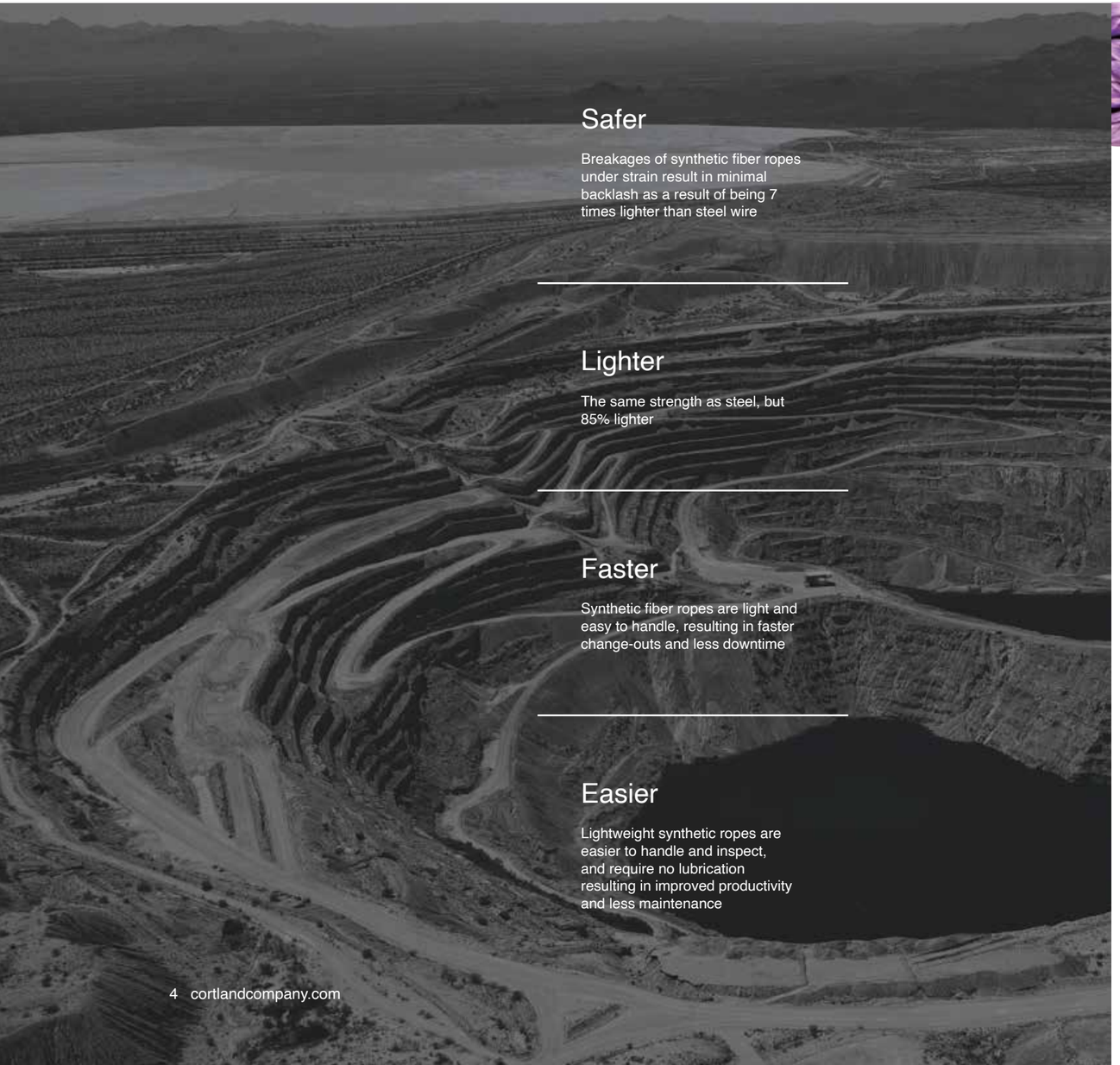
Designed to replace steel, synthetic rope solutions are now globally accepted as recovery and tow cables, lifting slings, and winch lines

Mining is one of the most punishing environments. Traditional steel wire ropes or chains used to pull, hoist, or lift in mining applications are heavy, inflexible, difficult to rig and can recoil dangerously when they break. Over the last two decades synthetic high performance rope solutions have become a critical component replacing steel wire rope.

Modern, high strength synthetic fiber ropes are remarkably light and incredibly strong. Being 85% lighter than steel wire rope, they offer superior flexibility which translates into fewer rigging injuries. Easy to inspect and repair, they are also soft on hands, offering significant reductions in rigging time and manpower.

Offering the same strength as steel, modern synthetic fiber ropes will not rust, corrode or produce broken/protruding wires (i.e., fish hooks). They are not affected by salt or fresh water, and wear points can be protected from abrasion, cutting and heat damage.

As an originator of fiber braiding technology, Cortland has more than 30 years of experience engineering certified synthetic fiber rope solutions that comply with international standards. We are leading the development of synthetic ropes for applications previously performed by steel wire ropes, setting standards for performance, safety and reliability resulting in significant performance and business benefits.



Safer

Breakages of synthetic fiber ropes under strain result in minimal backlash as a result of being 7 times lighter than steel wire

Lighter

The same strength as steel, but 85% lighter

Faster

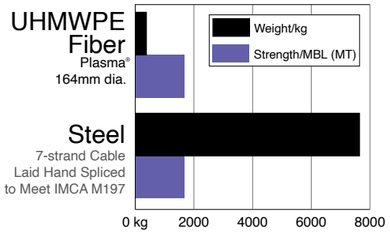
Synthetic fiber ropes are light and easy to handle, resulting in faster change-outs and less downtime

Easier

Lightweight synthetic ropes are easier to handle and inspect, and require no lubrication resulting in improved productivity and less maintenance

Cortland Plasma® 12×12: the first, and still the best

UHMWPE Fiber vs. Steel



Not all modern high performance synthetic solutions are designed and produced the same. While raw material choice, quality, construction, twist, braid levels, and coatings vary by manufacturer, we are proudly innovative in our fiber solution design and performance. Cortland fabricated ropes will produce weight, strength and product performance which cannot easily be compared with other manufacturers.

Our expertise in the use of high performance synthetic fibers hails back to the introduction of Kevlar® more than 40 years ago. The high strength, high modulus, low elongation, and light weight of modern high performance fibers are optimized by our manufacturing techniques and specialized constructions.

We design, manufacture and supply solutions using both conventional and modern high performance fibers. Each product is a combination of base fiber strength, design, and production methods combined to achieve peak efficiency in strength; while being balanced to meet service-life concerns.

All of our solutions are backed by extensive testing regimes and engineering expertise. Our products use secure construction with efficient splice terminations, and adhere to DNV, ASME and other key international standards. All products are tagged appropriately and backed by extensive production process control documentation.

Vehicle Recovery and Tow Cables

When heavy equipment becomes stuck, mine productivity goes down. Recovering a disabled vehicle can be a difficult and hazardous process. Steel wire rope or chain tow lines are heavy, inflexible and difficult to handle and rig. When these lines break, they can recoil in dangerous patterns to personnel and machinery.

Cortland synthetic braided rope recovery and tow lines, also known as Bog Strops, replace these steel cables. Quickly attached to recovery or towing equipment, wheeled or tracked vehicles, these cables can easily meet the toughest tests and have been popular in mining for more than 25 years.

Cortland's recovery and tow cables are typically supplied in an endless loop (grommet) fabrication with eye terminations each end. The rope is not affected by water, is very cut resistant and has excellent UV resistance; it also offers effective strength retention in the hottest or coldest environments.

To protect the fiber interior the entire cable body is encased in heavy duty high visibility protective jacketing. This extra-durable jacket provides protection during use from external abrasion, cutting, and ingress of dirt into the fiber core. Each end termination is protected with the most durable lightweight wear protection, and every cable delivered includes a tag providing the Minimum Break Load (MBL) and a unique serial number for traceability.

The pulling power of the recovery vehicle should be the determining factor for specifying the appropriate size cable for the application. This means either drawbar-pull for dozers, or rim-pull for trucks. This measurement is more important than the dead-weight of the disabled machine. Cortland recommends a minimum Safe Working Load (SWL) of 2.3:1 or higher for vehicle recovery or tow.

The key determining factor in choice of correctly sized/strength Cortland tow cable is the "pulling power" (either rim-pull or drawbar-pull) of the recovery/towing vehicle, NOT THE DEAD WEIGHT OF THE DISABLED VEHICLE. Pulling power of the recovery/tow vehicle plus a SWF (Safe Work Load) factor of 2.3:1 or higher should be used.

Common sizes of Cortland Vehicle Recovery / Tow Cables are shown below. However, custom sizes and lengths can be manufactured, if required.

Pulling-Power of Cat® Mine Vehicles

Dozers		Mine Haul Trucks	
D-8	139,000 lbs	785D	187,393 lbs
D-9	161,000 lbs	793F	230,000 lbs
D-10	225,000 lbs	795F	295,693 lbs
D-11	330,693 lbs	797F	340,000 lbs

Tow Cables fabricated with Plasma® rope, Grommet style (endless loop with formed eyes)

Part No.	Nominal Size		Minimum Break Load (MBL)		Eye Sizes Each End	Standard Length		Approx. Wt. per Cable		Target Vehicles
	Dia. inch	Dia. mm	lbs	Te (tonnes)		ft	m	lbs	kg	
T310G-25SST	5/8"	16	84,000	38	18"	25	7.6	5	2.3	Light Vehicles
T312G-25SST	3/4"	18	113,025	51	18"	25	7.6	7	3.2	Light Vehicles
T314G-25SST	7/8"	22	152,790	69	18"	25	7.6	10	4.5	Light Vehicles
T316G-25SST	1"	24	181,500	82	18"	25	7.6	16	7.3	Light Vehicles
T324G-30SST	1-1/2"	36	364,650	165	24"	30	9.1	36	16.3	Medium Vehicles & D6-8 dozers
T3332G-30SST	2"	48	585,750	266	36"	30	9.1	85	38.6	770-780 series CAT trucks & D-9 dozers
T3340G-30SST	2-1/2"	60	874,800	397	36"	30	9.1	103	46.7	790 series CAT Trucks & D-10/11 dozers

Tow Cables fabricated with Toro™ rope, Grommet style (endless loop with formed eyes)

Part No.	Nominal Size		Minimum Break Load (MBL)		Eye Sizes Each End	Standard Length		Approx. Wt. per Cable		Target Vehicles
	Dia. inch	Dia. mm	lbs	Te (tonnes)		ft	m	lbs	kg	
Z310G-25SST	5/8"	16	78,870	36	18"	25	7.6	5	2.3	Light Vehicles
Z312G-25SST	3/4"	18	101,970	46	18"	25	7.6	9	4.1	Light Vehicles
Z314G-25SST	7/8"	22	139,095	63	18"	25	7.6	12	5.4	Light Vehicles
Z316G-25SST	1"	24	173,250	79	18"	25	7.6	16	7.3	Light Vehicles
Z324G-30SST	1-1/2"	36	354,750	161	24"	30	9.1	38	17.2	Medium Vehicle & D6-D8 Dozers
Z3332G-30SST	2"	48	610,335	277	36"	30	9.1	68	30.8	Cat 770-780 series trucks & D9 dozers
Z3340G-30SST	2-1/2"	60	939,510	426	36"	30	9.1	105	47.6	Cat 790 series trucks & D11 dozers

Rope Lifting Slings

Cortland rope lifting slings are excellent lightweight lifting tools and safe alternatives to traditional wire rope slings. When trying to meet the technical lift specifications of larger and more challenging lifts, synthetic rope lifting solutions surpass traditional steel wire sling solutions through strength, weight, handling, and storage efficiencies. Cortland braided rope slings will outlast and outperform synthetic fiber round slings; standard or high performance.

There are many unique ways to fabricate rope into slings, two common methods are:
• single leg (eye-and-eye)
• endless loop (grommets)

Cortland synthetic fiber braided rope lifting slings are manufactured in the USA and tag certified to meet all ASME B30.9 lifting standards (other certification standards met upon request).

Correct choice of rope lifting sling requires a good understanding of strength, durability, contact lifting points and other possible factors which could affect the lifting sling. Considerations include:
• Bending fatigue or WLL rated capacity reductions due to connection point D:d ratios
• Length tolerances
• Temperatures greater than 150°F (65°C); in these circumstances, alternative fibers such as LCP or Aramid should be considered

Select the proper sling strength and fabrication configuration for the application, e.g., eye-and-eye or endless loop (grommet). When determining the correct size sling for the lift, be mindful of any bending diameter (D:d ratio), hardware used with each sling, or length tolerances needed. Consider wear protection needs, e.g., abrasion or 'rubbing' against surfaces during lift. Wear protection can be provided to cover both eye terminations and/or body or portions of the sling body. All Cortland rope slings are proof-loaded to 2x rated capacity.

Rope Sling Configuration

Just as important as selecting the right fiber and construction, selecting the correct configuration will further enhance the performance of any sling. There are two primary configurations for fiber rope slings:

• Eye and Eye
• Endless Grommet

Each configuration has its own features and benefits.

Eye and Eye Slings
When spliced into an eye and eye sling, UHMWPE will essentially act as a size-for-size replacement for a traditional steel wire rope sling in terms of strength. Each end is terminated using a Cortland-approved splice which becomes locked in place after proof load testing.

Due to the splice length and free span requirements as shown in the drawing below, eye and eye slings have minimum length that must be considered. The sling can be made only so short due to the splices. Refer to minimum sling length column in the Sling Rating charts beginning on page 10.

Eye-and-Eye fabrication with splice-terminated eyes each end:

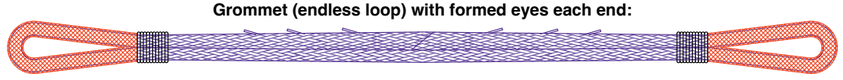
• Minimum D:d ratio in the eyes is 1:1
• Minimum eye length must be 6x the bearing surface diameter or pin diameter, to maintain the vertex angle below 30^0
• Rated capacity of eye-and-eye sling in a vertical pull includes splice efficiencies
• When basketing eye and eye slings the rated capacity will be affected when the basket point D:d ratio is less than 25:1

Endless Grommet Slings
Grommets are manufactured by splicing the ends of a rope together to form a continuous loop. Compared to eye-and-eye slings, they have increased strength with little to no increase in the chosen rope diameter due to two (2) legs holding the load. Alternatively, the same load can be held with a smaller rope diameter due to the two (2) legs holding the load.

The breaking strength of endless grommet slings is directly affected by the pin diameter on which they are mounted.

Grommet (endless loop):

Grommet (endless loop) with formed eyes each end:



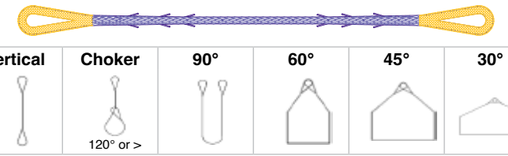
• Grommet sling rated capacity is directly related to the contact curvature on which it will be used
• Grommet sling ultimate strength is based on applying a configuration factor (CF) to the single leg strength to which the rope is made

Plasma® Rope Sling Rating Charts

Eye & Eye Sling Ratings—LBS

Vertical, choker and basket hitches
Basket hitch at varying angles

Ratings based on Design Factor of 5:1



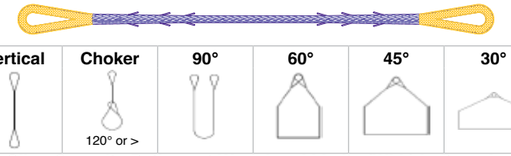
Nominal Size				Minimum Sling Length Ft/Inch	Sling Capacity Ratings at Work Load Limits (WLL) in Pounds Do Not Exceed WLL					
					Vertical	Choker	90°	60°	45°	30°
Dia. inch	Dia. mm	Circ. inch	MBL-pounds		Plasma® 12-Strand					
1/4	6	3/4	8,000	2' 1"	1,600	1,120	3,200	2,770	2,260	1,600
5/16	8	15/16	11,700	2' 5"	2,340	1,630	4,680	4,050	3,300	2,340
3/8	9	1-1/8	17,500	2' 8"	3,500	2,450	7,000	6,060	4,940	3,500
7/16	11	1-1/4	21,000	3' 0"	4,200	2,940	8,400	7,270	5,930	4,200
1/2	12	1-1/2	31,300	3' 2"	6,260	4,380	12,500	10,800	8,850	6,260
9/16	14	1-3/4	37,900	3' 6"	7,580	5,300	15,100	13,100	10,700	7,580
5/8	16	2	51,400	3' 10"	10,200	7,190	20,500	17,800	14,500	10,200
3/4	18	2-1/4	68,500	4' 4"	13,700	9,590	27,400	23,700	19,300	13,700
13/16	20	2-1/2	74,000	4' 7"	14,800	10,300	29,600	25,600	20,900	14,800
7/8	22	2-3/4	92,600	4' 11"	18,500	12,900	37,000	32,000	26,100	18,500
1	24	3	110,000	5' 5"	22,000	15,400	44,000	38,100	31,100	22,000
1-1/16	26	3-1/4	129,200	5' 8"	25,800	18,000	51,600	44,700	36,500	25,800
1-1/8	28	3-1/2	147,000	5' 11"	29,400	20,500	58,800	50,900	41,500	29,400
1-1/4	30	3-3/4	165,000	6' 6"	33,000	23,100	66,000	57,100	46,600	33,000
1-5/16	32	4	196,000	6' 10"	39,200	27,400	78,400	67,800	55,400	39,200
1-1/2	36	4-1/2	221,000	7' 7"	44,200	30,900	88,400	76,500	62,500	44,200
					Plasma® 12x12					
1-5/8	40	5	291,000	9' 1"	58,200	40,700	116,400	100,800	82,300	58,200
1-3/4	44	5-1/2	314,000	9' 10"	62,800	43,900	125,600	108,700	88,800	62,800
2	48	6	355,000	11' 0"	71,000	49,700	142,000	122,900	100,400	71,000
2-1/8	52	6-1/2	428,000	11' 7"	85,600	59,900	171,200	148,200	121,000	85,600
2-1/4	56	7	481,000	12' 4"	96,200	67,300	192,400	166,600	136,000	96,200
2-1/2	60	7-1/2	530,000	13' 6"	106,000	74,200	212,000	183,500	149,900	106,000
2-5/8	64	8	596,000	14' 1"	119,200	83,400	238,400	206,400	168,500	119,200
2-3/4	68	8-1/2	660,000	14' 8"	132,000	92,400	264,000	228,600	186,600	132,000
3	72	9	780,000	16' 0"	156,000	109,200	312,000	270,100	220,600	156,000
3-1/8	76	9-1/2	850,000	16' 7"	170,000	119,000	340,000	294,400	240,400	170,000
3-1/4	80	10	940,000	17' 2"	188,000	131,600	376,000	325,600	265,800	188,000
3-1/2	84	10-1/2	1,108,000	18' 6"	221,600	155,100	443,200	383,800	313,300	221,600
3-5/8	88	11	1,250,000	19' 1"	250,000	175,000	500,000	433,000	353,500	250,000
3-3/4	92	11-1/2	1,317,000	19' 8"	263,400	184,300	526,000	456,200	372,500	263,400
4	96	12	1,520,000	21' 0"	304,000	212,800	608,000	526,000	429,900	304,000
4-1/8	100	12-1/2	1,622,000	21' 7"	324,400	227,000	648,000	561,000	458,700	324,400
4-1/4	104	13	1,697,000	22' 2"	339,400	237,500	678,000	587,000	479,900	339,400
4-1/2	108	13-1/2	1,827,000	23' 6"	365,400	255,700	730,000	632,000	516,000	365,400
4-5/8	112	14	1,880,000	24' 1"	376,000	263,200	752,000	651,000	531,000	376,000
4-3/4	116	14-1/2	1,927,000	24' 8"	385,400	269,700	770,000	667,000	545,000	385,400
5	120	15	2,069,500	25' 11"	413,900	289,700	827,000	716,000	585,000	413,900
5-1/8	124	15-1/2	2,212,000	26' 7"	442,400	309,600	884,000	766,000	625,000	442,400
5-1/4	128	16	2,355,000	27' 2"	471,000	329,700	942,000	815,000	666,000	471,000
5-1/2	132	16-1/2	2,497,500	28' 5"	499,500	349,600	999,000	865,000	706,000	499,500
5-5/8	136	17	2,640,000	29' 1"	528,000	369,600	1,056,000	914,000	746,000	528,000
5-3/4	140	17-1/2	2,782,500	29' 8"	556,000	389,500	1,113,000	963,000	787,000	556,000
6	144	18	2,925,000	30' 11"	585,000	409,000	1,170,000	1,013,000	827,000	585,000
6-1/8	148	18-1/2	3,068,000	31' 6"	613,000	429,000	1,227,000	1,062,000	867,000	613,000
6-1/4	152	19	3,210,500	32' 2"	642,000	449,000	1,284,000	1,112,000	908,000	642,000
6-1/2	156	19-1/2	3,353,000	33' 5"	670,000	469,000	1,341,000	1,161,000	948,000	670,000
6-5/8	160	20	3,496,000	34' 0"	699,000	489,000	1,398,000	1,211,000	988,000	699,000

Chart continues on next page, along with caution statements and effect of bending considerations.

Eye & Eye Sling Ratings—LBS

Vertical, choker and basket hitches
Basket hitch at varying angles

Ratings based on Design Factor of 5:1



Nominal Size				Minimum Sling Length Ft/Inch	Sling Capacity Ratings at Work Load Limits (WLL) in Pounds Do Not Exceed WLL					
					Vertical	Choker	90°	60°	45°	30°
Dia. inch	Dia. mm	Circ. inch	MBL-pounds		Plasma® 12-Strand					
6-3/4	164	20-1/2	3,638,500	34' 8"	727,000	509,000	1,455,000	1,260,000	1,029,000	727,000
7	168	21	3,781,000	35' 11"	756,000	529,000	1,512,000	1,309,000	1,069,000	756,000
7-1/8	172	21-1/2	3,963,500	36' 6"	792,000	554,000	1,585,000	1,372,000	1,121,000	792,000
7-1/4	176	22	4,066,000	37' 1"	813,000	569,000	1,626,000	1,408,000	1,150,000	813,000
7-1/2	180	22-1/2	4,209,000	38' 5"	841,000	589,000	1,683,000	1,458,000	1,190,000	841,000
7-5/8	184	23	4,351,500	39' 0"	870,000	609,000	1,740,000	1,507,000	1,230,000	870,000
7-3/4	188	23-1/2	4,494,000	39' 7"	898,000	629,000	1,797,000	1,556,000	1,271,000	898,000
8	192	24	4,637,000	40' 11"	927,000	649,000	1,854,000	1,606,000	1,311,000	927,000
8-1/8	196	24-1/2	4,779,000	41' 6"	955,000	669,000	1,911,000	1,655,000	1,351,000	955,000
8-1/4	200	25	4,922,000	42' 1"	984,000	689,000	1,968,000	1,705,000	1,392,000	984,000

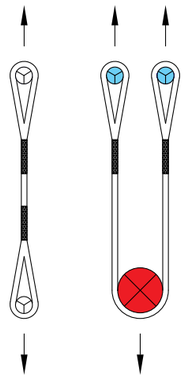
Minimum Break Load (MBL) in pounds is determined using spliced test samples in accordance with Cordage Institute 1500-02 - Test Method for Fiber Ropes.
Minimum sling length on Cortland fabricated Eye & Eye slings assumes 1) a compressed minimum eye length of 6.75 times the rope diameter in inches, and 2) a clear span area between splices of 10 times Cortland rope circumference in feet.
The recommended Design Factor (DF) of 5:1 on this chart is based on several existing sling standards including ASME B30.9. This design factor takes into account various factors including the use of Ultra High Molecular Weight Polyethylene (UHMWPE) fiber which is extremely durable and resistant to repeated high loads. Plasma® rope slings have and can be used with different DF ratios: however, this is a decision which must be made by a qualified person in conjunction with the rope manufacturer.
We recommend the use of wear protection around choking points. Please consult Cortland if you require the use of our fiber rope slings in a choker hitch at a lifting angle of less than 120°, following ASME B30.9 guidelines.

Bending Guidance

In theory, a sling used in a basket configuration could have twice the working load as a sling in a vertical configuration because two ropes are now holding the load instead of one. However, the decrease in tensile stress is partially offset by an increase in bending stress. The magnitude of this bending stress is dependent on the size and shape of the contact surface. Users must account for the bending strength loss with an efficiency factor as shown below in the Reduced Basket Capacity Calculation.

The bending efficiency reduces as the D:d ratio is reduced. Example: a 5:1 D:d ratio provides 80% efficiency.

Reduced Basket Capacity Calculation
C = B x e
C = Reduced Basket Capacity due to bending efficiency reduction
B = Rated Basket Capacity with consideration of horizontal sling fleet angle
e = Bending efficiency percentage



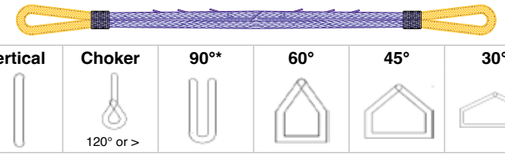
Represents a contact surface that is equal to or greater than the rope diameter

Represents a contact surface with a D:d ratio of one or greater. Refer to the Efficiency Table for deductions as needed.

Efficiency Table	
D:d Ratio	eff % (e)
25:1	100.0%
8:1	82.5%
5:1	80.0%
3:1	75.0%
2:1	72.5%
1:1	65.0%

Plasma® Rope Sling Rating Charts

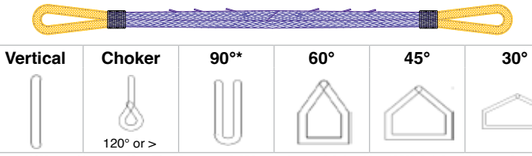
Endless Grommet Sling Ratings—LBS
One splice in one leg
Vertical, choker and basket hitches
Basket hitch at varying angles
Ratings based on Design Factor of 5:1 and D:d of 8:1



Nominal Size				Minimum Sling Length Ft/Inch	Sling Capacity Ratings at Work Load Limits (WLL) in Pounds Do Not Exceed WLL					
					Vertical	Choker	90°*	60°	45°	30°
Dia. inch	Dia. mm	Circ. inch	MBL-pounds		Plasma® 12-Strand					
1/4	6	3/4	13,200	0' 6"	2,640	1,120	4,750	4,110	3,360	2,370
5/16	8	15/16	19,305	0' 8"	3,860	1,630	6,940	6,010	4,910	3,470
3/8	9	1-1/8	28,875	0' 10"	5,770	2,450	10,300	9,000	7,350	5,190
7/16	11	1-1/4	34,650	0' 11"	6,930	2,940	12,400	10,800	8,820	6,230
1/2	12	1-1/2	51,645	1' 0"	10,300	4,380	18,500	16,100	13,100	9,290
9/16	14	1-3/4	62,535	1' 2"	12,500	5,300	22,500	19,400	15,900	11,200
5/8	16	2	84,810	1' 4"	16,900	7,190	30,500	26,400	21,500	15,200
3/4	18	2-1/4	113,025	1' 6"	22,600	9,590	40,600	35,200	28,700	20,300
13/16	20	2-1/2	122,100	1' 8"	24,400	10,300	43,900	38,000	31,000	21,900
7/8	22	2-3/4	152,790	1' 10"	30,500	12,900	55,000	47,600	38,800	27,500
1	24	3	181,500	2' 0"	36,300	15,400	65,300	56,500	46,200	32,600
1-1/16	26	3-1/4	213,180	2' 2"	42,600	18,000	76,700	66,400	54,200	38,300
1-1/8	28	3-1/2	242,550	2' 4"	48,500	20,500	87,300	75,600	61,700	43,600
1-1/4	30	3-3/4	272,250	2' 6"	54,400	23,100	98,000	84,800	69,300	49,000
1-5/16	32	4	323,400	2' 8"	64,600	27,400	116,400	100,800	82,300	58,200
1-1/2	36	4-1/2	364,650	3' 0"	72,900	30,900	131,200	113,600	92,800	65,600
					Plasma® 12x12					
1-5/8	40	5	480,150	3' 4"	96,000	40,700	172,800	149,600	122,200	86,400
1-3/4	44	5-1/2	518,100	3' 6"	103,600	43,900	186,500	161,500	131,800	93,200
2	48	6	585,750	4' 0"	117,100	49,700	210,800	182,600	149,100	105,400
2-1/8	52	6-1/2	706,200	4' 4"	141,200	59,900	254,200	220,100	179,700	127,100
2-1/4	56	7	793,650	4' 6"	158,700	67,300	285,700	247,400	202,000	142,800
2-1/2	60	7-1/2	874,500	5' 0"	174,900	74,200	314,800	272,600	222,600	157,400
2-5/8	64	8	983,400	5' 4"	196,600	83,400	354,000	306,500	250,300	177,000
2-3/4	68	8-1/2	1,089,000	5' 6"	217,800	92,400	392,000	339,500	277,200	196,000
3	72	9	1,287,000	6' 0"	257,400	109,200	463,300	401,200	327,600	231,600
3-1/8	76	9-1/2	1,402,500	6' 4"	280,500	119,000	504,000	437,200	357,000	252,400
3-1/4	80	10	1,551,000	6' 6"	310,200	131,600	558,000	483,500	394,800	279,100
3-1/2	84	10-1/2	1,828,200	7' 0"	365,600	155,100	658,000	569,000	465,300	329,000
3-5/8	88	11	2,062,500	7' 4"	412,500	175,000	742,000	643,000	525,000	371,200
3-3/4	92	11-1/2	2,173,050	7' 6"	434,600	184,300	782,000	677,000	553,000	391,100
4	96	12	2,508,000	8' 0"	501,000	212,800	902,000	781,000	638,000	451,400
4-1/8	100	12-1/2	2,676,300	8' 4"	535,000	227,000	963,000	834,000	681,000	481,700
4-1/4	104	13	2,800,050	8' 6"	560,000	237,500	1,008,000	872,000	712,000	504,000
4-1/2	108	13-1/2	3,014,550	9' 0"	602,000	255,700	1,085,000	939,000	767,000	542,000
4-5/8	112	14	3,102,000	9' 4"	620,000	263,200	1,116,000	967,000	789,000	558,000
4-3/4	116	14-1/2	3,179,550	9' 6"	635,000	269,700	1,144,000	991,000	809,000	572,000
5	120	15	3,414,675	10' 0"	682,000	289,700	1,229,000	1,064,000	869,000	614,000
5-1/8	124	15-1/2	3,649,800	10' 4"	729,000	309,600	1,313,000	1,137,000	929,000	656,000
5-1/4	128	16	3,885,750	10' 6"	777,000	329,700	1,398,000	1,211,000	989,000	699,000
5-1/2	132	16-1/2	4,120,875	11' 0"	824,000	349,600	1,483,000	1,284,000	1,049,000	741,000
5-5/8	136	17	4,356,000	11' 4"	871,000	369,600	1,568,000	1,358,000	1,108,000	784,000
5-3/4	140	17-1/2	4,591,125	11' 6"	918,000	389,500	1,652,000	1,431,000	1,168,000	826,000
6	144	18	4,826,250	12' 0"	965,000	409,000	1,737,000	1,504,000	1,228,000	868,000
6-1/8	148	18-1/2	5,062,200	12' 4"	1,012,000	429,000	1,822,000	1,578,000	1,288,000	911,000

Chart continues on next page, along with caution statements and effect of bending considerations.

Endless Grommet Sling Ratings—LBS
One splice in one leg
Vertical, choker and basket hitches
Basket hitch at varying angles
Ratings based on Design Factor of 5:1 and D:d of 8:1



Nominal Size				Minimum Sling Length Ft/Inch	Sling Capacity Ratings at Work Load Limits (WLL) in Pounds Do Not Exceed WLL					
					Vertical	Choker	90°*	60°	45°	30°
Dia. inch	Dia. mm	Circ. inch	MBL-pounds		Plasma® 12-Strand					
6-1/4	152	19	5,297,325	12' 6"	1,059,000	449,000	1,907,000	1,651,000	1,348,000	953,000
6-1/2	156	19-1/2	5,532,450	13' 0"	1,106,000	469,000	1,991,000	1,724,000	1,408,000	995,000
6-5/8	160	20	5,768,400	13' 4"	1,153,000	489,000	2,076,000	1,798,000	1,468,000	1,038,000
6-3/4	164	20-1/2	6,003,525	13' 6"	1,200,000	509,000	2,161,000	1,871,000	1,528,000	1,080,000
7	168	21	6,238,650	14' 0"	1,247,000	529,000	2,245,000	1,945,000	1,588,000	1,122,000
7-1/8	172	21-1/2	6,539,775	14' 4"	1,307,000	554,000	2,354,000	2,038,000	1,664,000	1,177,000
7-1/4	176	22	6,708,900	14' 6"	1,341,000	569,000	2,415,000	2,091,000	1,707,000	1,207,000
7-1/2	180	22-1/2	6,944,850	15' 0"	1,388,000	589,000	2,500,000	2,165,000	1,767,000	1,250,000
7-5/8	184	23	7,179,975	15' 4"	1,435,000	609,000	2,584,000	2,238,000	1,827,000	1,292,000
7-3/4	188	23-1/2	7,415,100	15' 6"	1,483,000	629,000	2,669,000	2,311,000	1,887,000	1,334,000
8	192	24	7,651,050	16' 0"	1,530,000	649,000	2,754,000	2,385,000	1,947,000	1,377,000
8-1/8	196	24-1/2	7,885,350	16' 4"	1,577,000	669,000	2,838,000	2,458,000	2,007,000	1,419,000
8-1/4	200	25	8,121,300	16' 6"	1,624,000	689,000	2,923,000	2,531,000	2,067,000	1,461,000

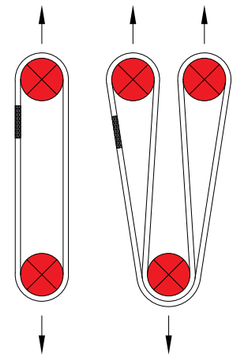
* This MBL includes a 10% reduction due to 55:45% load sharing. Minimum Break Load (MBL) in pounds is determined using spliced test samples in accordance with Cordage Institute 1500-02 - Test Method for Fiber Ropes. Specifications for endless loop (grommet) Plasma® rope slings assume one end-to-end splice. The length of splice determines the minimum length of a grommet sling.
The recommended Design Factor (DF) of 5:1 on this chart is based on several existing sling standards including ASME B30.9. This design factor takes into account various factors including the use of Ultra High Molecular Weight Polyethylene (UHMWPE) fiber which is extremely durable and resistant to repeated high loads. Plasma® rope slings have and can be used with different DF ratios: however, this is a decision which must be made by a qualified person in conjunction with the rope manufacturer.
Please consult Cortland if you require the use of our fiber rope slings in a choker hitch at a lifting angle of less than 120°, following ASME B30.9 guidelines.

Bending Guidance

In theory, a sling used in a basket configuration could have twice the working load as a sling in a vertical configuration because there are double the number of supporting strands. However, the decrease in tensile stress is partially offset by an increase in bending stress. The magnitude of this bending stress is dependent on the size and shape of the contact surface. Users must account for the bending strength loss with an efficiency factor as shown below in the Reduced Basket Capacity Calculation.

The bending efficiency reduces as the D:d ratio is reduced. Example: a 5:1 D:d ratio provides 97% efficiency.

Reduced Basket Capacity Calculation
C = B x e
C = Reduced Basket Capacity due to bending efficiency reduction
B = Rated Basket Capacity with consideration of horizontal sling fleet angle
e = Bending efficiency percentage



Represents a contact surface with a D:d ratio of one or greater. Refer to the Efficiency Table for deductions as needed.

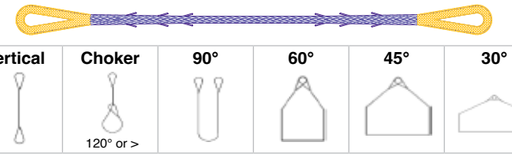
Efficiency Table	
D:d Ratio	eff % (e)
8:1	100.0%
5:1	97.0%
3:1	91.0%
2:1	88.0%
1:1	79.0%

Plasma® Rope Sling Rating Charts

Eye & Eye Sling Ratings—tonnes

Vertical, choker and basket hitches
Basket hitch at varying angles

Ratings based on Design Factor of 5:1



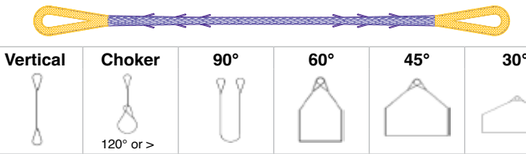
Nominal Size				Minimum Sling Length m	Sling Capacity Ratings at Work Load Limits (WLL) in tonnes Do Not Exceed WLL					
Dia. inch	Dia. mm	Circ. inch	MBL tonnes		Vertical	Choker	90°	60°	45°	30°
					Plasma® 12-Strand					
1/4	6	3/4	3.6	0.7	0.7	0.5	1.4	1.2	1.0	0.7
5/16	8	15/16	5.3	0.8	1.0	0.7	2.1	1.8	1.5	1.0
3/8	9	1-1/8	7.9	0.9	1.5	1.1	3.1	2.7	2.2	1.5
7/16	11	1-1/4	9.5	0.9	1.9	1.3	3.8	3.2	2.6	1.9
1/2	12	1-1/2	14.2	1.0	2.8	1.9	5.6	4.9	4.0	2.8
9/16	14	1-3/4	17.2	1.1	3.4	2.4	6.8	5.9	4.8	3.4
5/8	16	2	23.3	1.2	4.6	3.2	9.3	8.0	6.5	4.6
3/4	18	2-1/4	31.1	1.3	6.2	4.3	12.4	10.7	8.7	6.2
13/16	20	2-1/2	33.6	1.4	6.7	4.6	13.4	11.6	9.4	6.7
7/8	22	2-3/4	42.0	1.5	8.4	5.8	16.8	14.5	11.8	8.4
1	24	3	49.9	1.7	9.9	6.9	19.9	17.2	14.1	9.9
1-1/16	26	3-1/4	58.6	1.8	11.7	8.2	23.4	20.3	16.5	11.7
1-1/8	28	3-1/2	66.7	1.8	13.3	9.3	26.6	23.0	18.8	13.3
1-1/4	30	3-3/4	74.8	2.0	14.9	10.4	29.9	25.9	21.1	14.9
1-5/16	32	4	88.9	2.1	17.7	12.4	35.5	30.7	25.1	17.7
1-1/2	36	4-1/2	100.2	2.3	20.0	14.0	40.0	34.7	28.3	20.0
					Plasma® 12x12					
1-5/8	40	5	131	2.8	26	18	52	45	37	26
1-3/4	44	5-1/2	142	3.0	28	19	56	49	40	28
2	48	6	161	3.4	32	22	64	55	45	32
2-1/8	52	6-1/2	194	3.6	38	27	77	67	54	38
2-1/4	56	7	218	3.8	43	30	87	75	61	43
2-1/2	60	7-1/2	240	4.1	48	33	96	83	67	48
2-5/8	64	8	270	4.3	54	37	108	93	76	54
2-3/4	68	8-1/2	299	4.5	59	41	119	103	84	59
3	72	9	353	4.9	70	49	141	122	99	70
3-1/8	76	9-1/2	385	5.1	77	53	154	133	108	77
3-1/4	80	10	426	5.3	85	59	170	147	120	85
3-1/2	84	10-1/2	502	5.7	100	70	200	173	141	100
3-5/8	88	11	566	5.9	113	79	226	196	160	113
3-3/4	92	11-1/2	597	6.0	119	83	238	206	168	119
4	96	12	689	6.4	137	96	275	238	194	137
4-1/8	100	12-1/2	735	6.6	147	102	294	254	207	147
4-1/4	104	13	769	6.8	153	107	307	266	217	153
4-1/2	108	13-1/2	828	7.2	165	115	331	286	234	165
4-5/8	112	14	852	7.4	170	119	340	295	240	170
4-3/4	116	14-1/2	874	7.6	174	122	349	302	247	174
5	120	15	938	7.9	187	131	375	324	265	187
5-1/8	124	15-1/2	1,003	8.1	200	140	401	347	283	200
5-1/4	128	16	1,068	8.3	213	149	427	369	302	213
5-1/2	132	16-1/2	1,132	8.7	226	158	452	392	320	226
5-5/8	136	17	1,197	8.9	239	167	478	414	338	239
5-3/4	140	17-1/2	1,262	9.1	252	176	504	437	356	252
6	144	18	1,326	9.5	265	185	530	459	375	265
6-1/8	148	18-1/2	1,391	9.6	278	194	556	481	393	278

Chart continues on next page, along with caution statements and effect of bending considerations.

Eye & Eye Sling Ratings—tonnes

Vertical, choker and basket hitches
Basket hitch at varying angles

Ratings based on Design Factor of 5:1



Nominal Size				Minimum Sling Length m	Sling Capacity Ratings at Work Load Limits (WLL) in tonnes Do Not Exceed WLL					
Dia. inch	Dia. mm	Circ. inch	MBL tonnes		Vertical	Choker	90°	60°	45°	30°
					Plasma® 12-Strand					
6-1/4	152	19	1,456	9.8	291	203	582	504	411	291
6-1/2	156	19-1/2	1,520	10.2	304	212	608	526	429	304
6-5/8	160	20	1,585	10.4	317	221	634	549	448	317
6-3/4	164	20-1/2	1,650	10.6	330	231	660	571	466	330
7	168	21	1,715	11.0	343	240	686	594	485	343
7-1/8	172	21-1/2	1,797	11.2	359	251	718	622	508	359
7-1/4	176	22	1,844	11.4	368	258	737	638	521	368
7-1/2	180	22-1/2	1,909	11.7	381	267	763	661	539	381
7-5/8	184	23	1,973	11.9	394	276	789	683	558	394
7-3/4	188	23-1/2	2,038	12.1	407	285	815	705	576	407
8	192	24	2,103	12.5	420	294	841	728	594	420
8-1/8	196	24-1/2	2,167	12.7	433	303	866	750	612	433
8-1/4	200	25	2,232	12.9	446	312	892	773	631	446

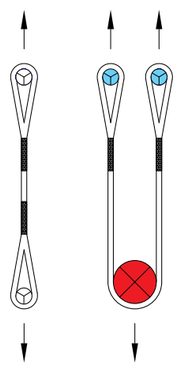
Minimum Break Load (MBL) in tonnes is determined using spliced test samples in accordance with Cordage Institute 1500-02 - Test Method for Fiber Ropes.
Minimum sling length on Cortland fabricated Eye & Eye slings assumes 1) a compressed minimum eye length of 6.75 times the rope diameter in millimeters, and 2) a clear span area between splices of 10 times Cortland rope circumference in feet.
The recommended Design Factor (DF) of 5:1 on this chart is based on several existing sling standards including ASME B30.9. This design factor takes into account various factors including the use of Ultra High Molecular Weight Polyethylene (UHMWPE) fiber which is extremely durable and resistant to repeated high loads. Plasma® rope slings have and can be used with different DF ratios: however, this is a decision which must be made by a qualified person in conjunction with the rope manufacturer.
We recommend the use of wear protection around choking points. Please consult Cortland if you require the use of our fiber rope slings in a choker hitch at a lifting angle of less than 120°, following ASME B30.9 guidelines.

Bending Guidance

In theory, a sling used in a basket configuration could have twice the working load as a sling in a vertical configuration because two ropes are now holding the load instead of one. However, the decrease in tensile stress is partially offset by an increase in bending stress. The magnitude of this bending stress is dependent on the size and shape of the contact surface. Users must account for the bending strength loss with an efficiency factor as shown below in the Reduced Basket Capacity Calculation.

The bending efficiency reduces as the D:d ratio is reduced. Example: a 5:1 D:d ratio provides 80% efficiency.

Reduced Basket Capacity Calculation
C = B x e
C = Reduced Basket Capacity due to bending efficiency reduction
B = Rated Basket Capacity with consideration of horizontal sling fleet angle
e = Bending efficiency percentage



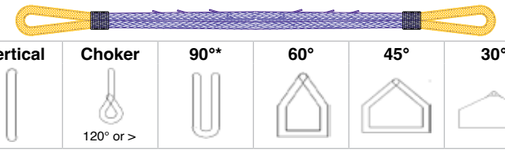
Represents a contact surface that is equal to or greater than the rope diameter

Represents a contact surface with a D:d ratio of one or greater. Refer to the Efficiency Table for deductions as needed.

Efficiency Table	
D:d Ratio	eff % (e)
25:1	100.0%
8:1	82.5%
5:1	80.0%
3:1	75.0%
2:1	72.5%
1:1	65.0%

Plasma® Rope Sling Rating Charts

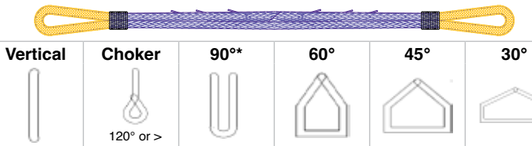
Endless Grommet Sling Ratings—tonnes
One splice in one leg
Vertical, choker and basket hitches
Basket hitch at varying angles
Ratings based on Design Factor of 5:1 and D:d of 8:1



Nominal Size				Minimum Sling Length m	Sling Capacity Ratings at Work Load Limits (WLL) in tonnes Do Not Exceed WLL					
					Plasma® 12-Strand					
Dia. inch	Dia. mm	Circ. inch	MBL tonnes		Vertical	Choker	90°*	60°	45°	30°
1/4	**6**	3/4	5.9	0.2	1.1	0.5	2.1	1.8	1.5	1.0
5/16	**8**	15/16	8.7	0.2	1.7	0.7	3.1	2.7	2.2	1.5
3/8	**9**	1-1/8	13.0	0.3	2.6	1.1	4.7	4.0	3.3	2.3
7/16	**11**	1-1/4	15.7	0.3	3.1	1.3	5.6	4.9	4.0	2.8
1/2	**12**	1-1/2	23.4	0.4	4.6	1.9	8.4	7.3	5.9	4.2
9/16	**14**	1-3/4	28.3	0.4	5.6	2.4	10.2	8.8	7.2	5.1
5/8	**16**	2	38.4	0.4	7.6	3.2	13.8	11.9	9.7	6.9
3/4	**18**	2-1/4	51.2	0.5	10.2	4.3	18.4	15.9	13.0	9.2
13/16	**20**	2-1/2	55.3	0.5	11.0	4.6	19.9	17.2	14.0	9.9
7/8	**22**	2-3/4	69.3	0.6	13.8	5.8	24.9	21.6	17.6	12.4
1	**24**	3	82.3	0.7	16.4	6.9	29.6	25.6	20.9	14.8
1	**26**	3-1/4	96.6	0.7	19.3	8.2	34.8	30.1	24.6	17.4
1-1/8	**28**	3-1/2	110.0	0.7	22.0	9.3	39.6	34.3	28.0	19.8
1-1/4	**30**	3-3/4	123.4	0.8	24.6	10.4	44.4	38.5	31.4	22.2
1-1/3	**32**	4	146.6	0.9	29.3	12.4	52.8	45.7	37.3	26.4
1-1/4	**36**	4-1/2	165.4	1.0	33.0	14.0	59.5	51.5	42.1	29.7
					Plasma® 12x12					
1-5/8	**40**	5	217	1.0	43	18	78	67	55	39
1-3/4	**44**	5-1/2	235	1.1	47	19	84	73	59	42
2	**48**	6	265	1.3	53	22	95	82	67	47
2-1/8	**52**	6-1/2	320	1.3	64	27	115	99	81	57
2-1/4	**56**	7	359	1.4	71	30	129	112	91	64
2-1/2	**60**	7-1/2	396	1.6	79	33	142	123	100	71
2-5/8	**64**	8	446	1.7	89	37	160	139	113	80
2-3/4	**68**	8-1/2	493	1.7	98	41	177	154	125	88
3	**72**	9	583	1.9	116	49	210	182	148	105
3-1/8	**76**	9-1/2	636	2.0	127	53	229	198	161	114
3-1/4	**80**	10	703	2.0	140	59	253	219	179	126
3-1/2	**84**	10-1/2	829	2.2	165	70	298	258	211	149
3-5/8	**88**	11	935	2.3	187	79	336	291	238	168
3-3/4	**92**	11-1/2	985	2.3	197	83	354	307	250	177
4	**96**	12	1,137	2.5	227	96	409	354	289	204
4-1/8	**100**	12-1/2	1,213	2.6	242	103	437	378	309	218
4-1/4	**104**	13	1,270	2.6	254	107	457	395	323	228
4-1/2	**108**	13-1/2	1,367	2.8	273	116	492	426	348	246
4-5/8	**112**	14	1,407	2.9	281	119	506	438	358	253
4-3/4	**116**	14-1/2	1,442	2.9	288	122	519	449	367	259
5	**120**	15	1,548	3.1	309	131	557	482	394	278
5-1/8	**124**	15-1/2	1,655	3.2	331	140	595	516	421	297
5-1/4	**128**	16	1,762	3.3	352	149	634	549	448	317
5-1/2	**132**	16-1/2	1,869	3.4	373	158	672	582	475	336
5-5/8	**136**	17	1,975	3.5	395	167	711	616	502	355
5-3/4	**140**	17-1/2	2,082	3.6	416	176	749	649	530	374
6	**144**	18	2,187	3.7	437	185	787	681	556	393
6-1/8	**148**	18-1/2	2,294	3.8	458	194	825	715	583	412

Chart continues on next page, along with caution statements and effect of bending considerations.

Endless Grommet Sling Ratings—tonnes
One splice in one leg
Vertical, choker and basket hitches
Basket hitch at varying angles
Ratings based on Design Factor of 5:1 and D:d of 8:1



Nominal Size				Minimum Sling Length m	Sling Capacity Ratings at Work Load Limits (WLL) in tonnes Do Not Exceed WLL					
					Plasma® 12-Strand					
Dia. inch	Dia. mm	Circ. inch	MBL tonnes		Vertical	Choker	90°*	60°	45°	30°
6-1/4	**152**	19	2,400	3.9	480	203	864	748	611	432
6-1/2	**156**	19-1/2	2,507	4.0	501	212	902	781	638	451
6-5/8	**160**	20	2,614	4.1	522	221	941	815	665	470
6-3/4	**164**	20-1/2	2,720	4.2	544	230	979	848	692	489
7	**168**	21	2,827	4.3	565	239	1017	881	719	508
7-1/8	**172**	21-1/2	2,963	4.4	592	251	1066	923	754	533
7-1/4	**176**	22	3,040	4.5	608	257	1094	947	773	547
7-1/2	**180**	22-1/2	3,147	4.6	629	267	1133	981	801	566
7-5/8	**184**	23	3,253	4.7	650	276	1171	1014	828	585
7-3/4	**188**	23-1/2	3,360	4.8	672	285	1209	1047	855	604
8	**192**	24	3,467	4.9	693	294	1248	1081	882	624
8-1/8	**196**	24-1/2	3,573	5.0	714	303	1286	1114	909	643
8-1/4	**200**	25	3,680	5.1	736	312	1324	1147	936	662

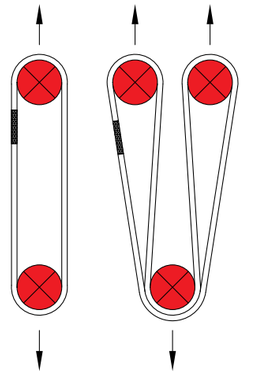
* This MBL includes a 10% reduction due to 55:45% load sharing. Minimum Break Load (MBL) in tonnes is determined using spliced test samples in accordance with Cordage Institute 1500-02 - Test Method for Fiber Ropes. Specifications for endless loop (grommet) Plasma® rope slings assume one end-to-end splice. The length of splice determines the minimum length of a grommet sling.
The recommended Design Factor (DF) of 5:1 on this chart is based on several existing sling standards including ASME B30.9. This design factor takes into account various factors including the use of Ultra High Molecular Weight Polyethylene (UHMWPE) fiber which is extremely durable and resistant to repeated high loads. Plasma rope slings have and can be used with different DF ratios: however, this is a decision which must be made by a qualified person in conjunction with the rope manufacturer.
We recommend the use of wear protection around choking points. Please consult Cortland if you require the use of our fiber rope slings in a choker hitch at a lifting angle of less than 120°, following ASME B30.9 guidelines.

Bending Guidance

In theory, a sling used in a basket configuration could have twice the working load as a sling in a vertical configuration because there are double the number of supporting strands. However, the decrease in tensile stress is partially offset by an increase in bending stress. The magnitude of this bending stress is dependent on the size and shape of the contact surface. Users must account for the bending strength loss with an efficiency factor as shown below in the Reduced Basket Capacity Calculation.

The bending efficiency reduces as the D:d ratio is reduced. Example: a 5:1 D:d ratio provides 97% efficiency.

Reduced Basket Capacity Calculation
C = B x e
C = Reduced Basket Capacity due to bending efficiency reduction
B = Rated Basket Capacity with consideration of horizontal sling fleet angle
e = Bending efficiency percentage



Represents a contact surface with a D:d ratio of one or greater. Refer to the Efficiency Table for deductions as needed.

Efficiency Table	
D:d Ratio	eff % (e)
8:1	100.0%
5:1	97.0%
3:1	91.0%
2:1	88.0%
1:1	79.0%

High Performance Round Slings

High performance synthetic round slings are as strong as steel wire rope slings, yet light weight, and are safer and less labor intensive. Even the heaviest of loads can be quickly and safely rigged and lifted, minimizing downtime.

High performance round slings from Cortland feature an endless loop construction (parallel laid endless filaments) of UHMWPE materials, enabling these slings to be manufactured with very low elongation under load; and at very high strength. They are available in short lengths, with vertical capacities from 40,000 lbs (18.2Te) to 500,000 lbs (226.8Te); higher capacities are available upon request.

Their lightweight design and equal strength-to-size profile vs. wire rope make these ideal tools for heavy lifts. To protect potential chafe areas from abrasion, cutting, or snagging, the core material is encased in a tough protective nylon jacket to ensure a durable and long-lasting lift solution.

Features

- Stronger, safer, and easier to handle than steel
- Lightweight and flexible
- Lengths from 5ft (1.524 m) to 72 ft (22 m); longer lengths available upon request
- Matched slings are easily achieved, +/- 0.25% of nominal length, tolerance for matched sets is 0.1% nominal length
- Vertical capacities from 40,000 to 500,000 lbs as standard
- Friendly on painted surfaces or sensitive equipment
- Durable construction
- Repairable or replaceable jacket

All Cortland high performance round slings are proof loaded and length verified and supplied with a proof loading certificate; third party witnessing is available upon request.

SRS™ Slings are available as standard, in lengths varying from a short 5 ft (1.524 m) up to 72 ft (22 m); please specify length at time of order. Higher capacities and custom designs are available upon request.

SRS™ Slings

Vertical Lift Rating to ASME B30.9 (5:1 WLL)

Sling Details

Part No	Approximate Diameter		Weight		Minimum Bending Diameter		Minimum Width	
	inch	mm	lbs/ft	kg/m	inch	mm	inch	mm
SRS-40	**2.2**	56	**1.7**	1.2	**1.95**	49	**2.9**	73
SRS-50	**2.4**	61	**2.0**	1.4	**2.14**	54	**3.1**	79
SRS-60	**2.6**	66	**2.3**	1.5	**2.33**	59	**3.4**	86
SRS-70	**2.8**	70	**2.6**	1.7	**2.51**	64	**3.6**	91
SRS-85	**3.0**	75	**3.0**	2.0	**2.78**	71	**3.9**	98
SRS-100	**3.2**	80	**3.5**	2.4	**3.05**	77	**4.1**	104
SRS-125	**3.5**	88	**4.3**	2.9	**3.5**	89	**4.5**	114
SRS-150	**3.7**	95	**4.6**	3.1	**3.93**	100	**4.8**	124
SRS-175	**3.9**	100	**5.3**	3.5	**4.35**	110	**5.1**	130
SRS-200	**4.2**	107	**6.3**	4.2	**4.76**	121	**5.5**	139
SRS-250	**4.5**	115	**7.7**	5.1	**5.56**	141	**5.9**	150
SRS-275	**4.7**	119	**8.4**	5.6	**5.94**	151	**6.1**	155
SRS-300	**4.9**	123	**9.2**	6.2	**6.31**	160	**6.3**	160
SRS-400	**5.5**	138	**12.4**	8.4	**7.7**	196	**7.1**	179
SRS-500	**6.0**	152	**15.8**	10.6	**8.92**	227	**7.8**	198

Chart continues below

Part No	Rated Capacity					
	Vertical		Choker		Basket	
	lbs	Te	lbs	Te	lbs	Te
SRS-40	**40,000**	18.2	**32,000**	14.5	**80,000**	36.4
SRS-50	**50,000**	22.8	**40,000**	18.2	**100,000**	45.6
SRS-60	**60,000**	27.4	**48,000**	21.9	**120,000**	54.8
SRS-70	**70,000**	31.8	**56,000**	25.4	**140,000**	63.6
SRS-85	**85,000**	38.6	**68,000**	30.8	**170,000**	77.2
SRS-100	**100,000**	45.4	**80,000**	36.3	**200,000**	90.8
SRS-125	**125,000**	56.8	**100,000**	45.4	**250,000**	113.6
SRS-150	**150,000**	68.2	**120,000**	54.5	**300,000**	136.4
SRS-175	**175,000**	79.4	**140,000**	63.5	**350,000**	158.8
SRS-200	**200,000**	90.8	**160,000**	72.6	**400,000**	181.6
SRS-250	**250,000**	113.4	**200,000**	90.7	**500,000**	226.8
SRS-275	**275,000**	124.8	**220,000**	99.8	**550,000**	249.6
SRS-300	**300,000**	136.2	**240,000**	108.9	**600,000**	272.4
SRS-400	**400,000**	181.6	**320,000**	145.2	**800,000**	363.2
SRS-500	**500,000**	226.8	**400,000**	181.4	**1,000,000**	453.6

Extender™ Adjustable Slings

When load handling heavy equipment becomes a challenge—especially when lifting loads with differential sling lengths—adjustable high performance synthetic rope slings are ideal tools. Cortland offers high performance synthetic fiber rope slings in an adjustable form: Extender™ Slings.

Extender Slings have one permanent eye, and one eye that is adjustable, which means it can be tightly sized to fit an application, then lengthened or shortened to fit a different application. A single Extender Sling can solve lifting requirements in a wide variety of situations. This changes a high performance rope sling from a specific-use tool, to one that is adaptable for multiple uses; minimizing the number of lifting slings needed in-stock.

Extender Slings are currently available with standard vertical lifting capacities from 10 to 250 tons. All single leg or multi-leg Extender slings are proof-loaded to 2x WLL (5:1), have less than 1% elongation under WLL, and are properly tagged.

Features and Benefits

- UHMWPE high performance lifting sling
- One permanent eye, one adjustable eye
- Length adjustable, to use in a variety of applications
- Opposing force tightens the adjustable splice, preventing any lengthening of the sling
- Lightweight flexibility for safe and fast rigging
- Minimum length dependent on rope diameter size; no max length limitations
- Easy to inspect
- Durable cut-resistant eye terminations
- Many wear protection options, offering increased protection yet allowing for inspection

Extender™ Slings are adjustable to allow use in a variety of applications; they feature one permanent eye and one adjustable eye

Extender™ Adjustable Slings

Nominal diameter		Size (circ. in.)	Sling Rated Capacities @ 5:1 WLL (lbs)				Minimum eye size		Minimum OAL	
			Vertical		Basket					
inches	mm		lbs	tonnes	lbs	tonnes	inches	mm	feet	m
Plasma 12 Strand										
1/4	6	**3/4**	**1,280**	0.6	**2,560**	1.2	**6**	152.4	**4**	1.2
5/16	8	**15/16**	**1,872**	0.8	**3,744**	1.7	**6**	152.4	**4**	1.2
3/8	9	**1-1/8**	**2,800**	1.3	**5,600**	2.5	**6**	152.4	**5**	1.5
7/16	11	**1-1/4**	**3,360**	1.5	**6,720**	3.0	**6**	152.4	**6**	1.8
1/2	12	**1-1/2**	**5,008**	2.3	**10,016**	4.5	**6**	152.4	**6**	1.8
9/16	14	**1-3/4**	**6,064**	2.8	**12,128**	5.5	**6**	152.4	**7**	2.1
5/8	16	**2**	**8,224**	3.7	**16,448**	7.5	**6**	152.4	**7**	2.1
3/4	18	**2-1/4**	**10,960**	5.0	**21,920**	9.9	**6**	152.4	**8**	2.4
13/16	20	**2-1/2**	**11,840**	5.4	**23,680**	10.7	**6**	152.4	**9**	2.7
7/8	22	**2-3/4**	**14,816**	6.7	**29,632**	13.4	**6**	152.4	**10**	3.0
1	24	**3**	**17,600**	8.0	**35,200**	16.0	**8**	203.2	**11**	3.4
1-1/16	26	**3-1/4**	**20,672**	9.4	**41,334**	18.7	**8**	203.2	**12**	3.7
1-1/8	28	**3-1/2**	**23,520**	10.7	**47,040**	21.3	**8**	203.2	**12**	3.7
1-1/4	30	**3-3/4**	**26,400**	12.0	**52,800**	23.9	**8**	203.2	**13**	4.0
1-5/16	32	**4**	**31,360**	14.2	**62,720**	28.4	**8**	203.2	**14**	4.3
1-1/2	36	**4-1/2**	**35,360**	16.0	**70,720**	32.1	**8**	203.2	**16**	4.9
Plasma 12x12										
1-5/8	40	**5**	**46,560**	21.1	**93,120**	42.2	**12**	304.8	**18**	5.5
1-3/4	44	**5-1/2**	**50,240**	22.8	**100,480**	45.6	**12**	304.8	**20**	6.1
2	48	**6**	**56,800**	25.8	**113,600**	51.5	**12**	304.8	**21**	6.4
2-1/8	52	**6-1/2**	**68,480**	31.1	**136,960**	62.1	**12**	304.8	**23**	7.0
2-1/4	56	**7**	**76,960**	34.9	**153,920**	69.8	**12**	304.8	**26**	7.9
2-1/2	60	**7-1/2**	**84,800**	38.5	**169,600**	76.9	**12**	304.8	**27**	8.2
2-5/8	64	**8**	**95,360**	43.3	**190,720**	86.5	**12**	304.8	**27**	8.2
2-3/4	68	**8-1/2**	**105,600**	47.9	**211,200**	95.8	**12**	304.8	**28**	8.5
3	72	**9**	**124,800**	56.6	**249,600**	113.2	**12**	304.8	**30**	9.1
3-1/8	76	**9-1/2**	**136,000**	61.7	**272,000**	123.4	**18**	457.2	**32**	9.8
3-1/4	80	**10**	**150,400**	68.2	**300,800**	136.4	**18**	457.2	**34**	10.4
3-1/2	84	**10-1/2**	**177,280**	80.4	**354,560**	160.8	**18**	457.2	**36**	11.0
3-5/8	88	**11**	**200,000**	90.7	**400,000**	181.4	**18**	457.2	**37**	11.3
3-3/4	92	**11-1/2**	**210,720**	95.6	**421,440**	191.2	**18**	457.2	**38**	11.6
4	96	**12**	**243,200**	110.3	**486,400**	220.6	**18**	457.2	**40**	12.2

Extender™ slings must only be basketed in the slings' clear spans and never loaded on a spliced area. Extender slings must never be used in a choker configuration.
This MBL includes a 20% reduction from traditional, non-adjustable Plasma Eye and Eye Slings due to efficiency losses in the adjustable splice. Minimum Break Load (MBL) in pounds is determined using spliced test samples in accordance with Cordage Institute 1500-02—Test Method for Fiber Ropes. Specifications for Extender slings assume one fixed eye splice and one adjustable "pass through" splice. The length of the two splices determines the minimum length of the Extender Sling.
This design factor takes into account various factors including the use of Ultra High Molecular Weight Polyethylene (UHMWPE) fiber which is extremely durable and resistant to repeated high loads. The recommended Design Factor (DF) of 5:1 on this chart is based on several existing sling standards including ASME B30.9. Extender rope slings have and can be used with different DF ratios: however, this is a decision which must be made by a qualified person in conjunction with the rope manufacturer.
Refer to a Cortland representative for effect of bending considerations with Extender™ slings.

Winch Lines and Truck Bridles

Today's mine operators need products and equipment that will help them do their job safer, faster, and better

Winch Lines Cortland manufactures a wide range of high performance synthetic fiber winch lines which are stronger, safer, lighter and easier to handle than wire cable. The chart below illustrates the weight savings using synthetic options—which meet or exceed the same break strength as steel.

Toro™ Rope (12-Strand & 12x12)			Steel Wire Rope (6x19 or 6x36 IPS)		
Dia	**Wt/100ft**	**MBL**	**Dia**	**Wt/100ft**	**MBL**
1"	24 lbs	105,000 lbs	1"	168 lbs	92,000 lbs
1-1/2"	54 lbs	215,000 lbs	1-1/2"	378 lbs	202,000 lbs
2"	95 lbs	369,900 lbs	2"	673 lbs	352,000 lbs

Cortland's Plasma® winch lines spool even, and pull off the drum easier than steel—strong, safe, and reliable every time. They offer superior flexibility and are easy to inspect; they will also not rust, corrode or produce broken/protruding wires as wire rope can. These features translate into less downtime and higher productivity at a mine. Other synthetic fiber constructions are available, depending upon the application.

Mine Haul Truck Body Cables Using the amazing lightweight strength benefits of Plasma® fiber as its core strength member, Cortland offers mine haul truck body cables designed and built specifically to keep a truck bed open during maintenance. The secure connection will provide similar elongation properties to the wire rope cable it is designed to replace. All Cortland mine haul truck body cables are proof-tested to 2 times the WLL prior to shipment, load-rated and tagged.

Specialized Configurations Aside from a supply of standard items and rope solutions, our dedicated engineering team is able to meet the needs for specialized and tailor-made solutions. If you have applications where the benefits of synthetic solutions being safer, lighter, faster and easier could help solve existing issues today, reach out to us at cortland@cortlandcompany.com.

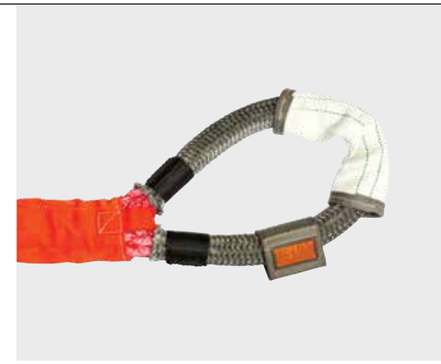
Wear Protection In the real-world environment of today's mines, protecting ropes from abrasion and cutting significantly increases their service life. Specialized wear protection can be installed on rope assemblies in places where the wear might commonly occur. With the addition of wear protection gear, the useful life of high performance rope solutions can be increased, creating maximum cost efficiency with minimal maintenance. For further details on our solutions, refer to our Wear Protection brochure.

Optional Storage Totes Durable, weather-resistant containers are recommended for storage of high performance products, away from heat, strong sunlight and corrosive substances. An optional weather-resistant storage tote for Cortland products can be provided to protect UHMWPE fiber rope solutions, any connection hardware and extra wear protection.

What can we do for you?
Whatever your particular challenge, Cortland welcomes the opportunity to solve it.

We have the unique experience to help today's mines lower costs, save time, increase safety and gain far better efficiencies. Our service doesn't end with product delivery. We also provide ongoing technical support and training for everyone involved with operating and maintaining the solution we provide.

Please email cortland@cortlandcompany.com for an initial discussion, or visit us online at cortlandcompany.com.



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Cortland is a global designer, manufacturer, and supplier of technologically advanced ropes, slings, and strength members. Collaborating with customers, our team uses its experience in high performance materials and market knowledge to transform ideas into proven products.

For more than 35 years, our custom-built solutions have been developed for work in the toughest environments and to overcome some of the world's greatest challenges. They consistently enable our customers to meet the demands of the aerospace, defense, research, subsea, marine, and energy industries.

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