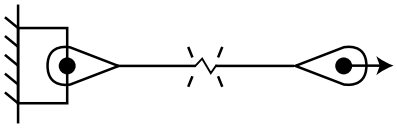
New UHMWPE Fiber Rope

Toro®

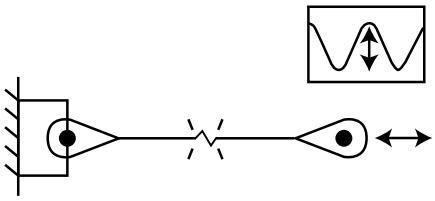
CORTLAND™
A CORTLAND INTERNATIONAL COMPANY

Cortland Toro® Rope

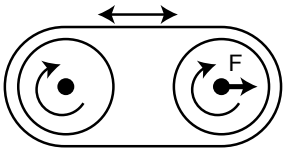
Introducing a new UHMWPE fiber rope with superior strength and durability, worthy of the Cortland name



Break testing



Tension fatigue testing



CBOS testing

Toro® from Cortland is a new, state-of-the-art rope solution manufactured from Ultra High Molecular Weight Polyethylene (UHMWPE) fiber. This incredibly durable 12-strand or 12x12 braided rope features superior flex fatigue and wear resistance properties. With an unsurpassed strength-to-weight ratio, it matches the strength of steel wire rope at the same size making it an exceptional lightweight replacement option. Engineered with a pliable, torque-free braided design, Toro rope is an easy-to-handle and economic solution.

We Put Seven Years of Due Diligence and Quality Testing on the Line

To validate fiber quality, extensive research and qualification processes have been conducted over the past seven years. From break tests to tension fatigue testing, Cortland Toro ropes meet exacting performance requirements.

Cortland engineers put Toro ropes through more than 100 rigorous, documented break tests. Additional break tests were conducted the first time each rope size was manufactured. After initial testing, subsequent testing followed, in line with Cortland standard rope qualification (SRQ) procedures.

- Break testing
- Tension fatigue testing
- CBOS testing
- Yarn break testing

Toro® Rope Features

- Highest strength
- Very low stretch
- Lightweight
- Soft hand
- Torque free
- Easy splicing
- Long lengths available
- High flex fatigue and abrasion resistance
- Easy to inspect and repair
- Neutrally buoyant in water; floats

Ongoing Fiber Testing Ensures Quality
While a Certificate of Conformity (COC) is generated by the fiber supplier for every lot, Cortland executes its own fiber quality test procedures.

- Test reports are supplied with multiple-yarn break-test results from every fiber bobbin received
- Fiber bobbins are randomly sampled by Cortland for break-testing internally to verify the vendor-supplied properties
- Results are statistically compared with the entire population continuously

Proven Strength and Durability in Rigorous Field Testing
For more than three years, the same fiber used to make Toro® ropes has been undergoing comprehensive field testing. In real-world applications on land and at sea Toro ropes have been proven for a wide-range of applications:

- Utility winch and pulling lines
- Inland river barge lines
- Vessel mooring lines and tug assist lines
- Offshore working ropes
- Lifting slings
- Replacement for wire rope

Toro 12-strand and 12x12 is delivered as standard with a red polyurethane finish. The rope construction is easily field spliced using a simple lockstitch bury splice, or tuck splice.

Toro® 12-Strand and 12x12

	Nominal Diameter		Size (circ in.)	Approximate Weight		Minimum Tensile Strength Spliced Rope		Minimum Tensile Strength ISO Unspliced Rope	
	inch	mm		lbs/ 100ft	kg/ 100m	lbs	MT (tonnes)	lbs	MT (tonnes)
12-Strand	1/8	3	3/8	0.69	1.03	2,800	1.27	3,110	1.41
	3/16	5	9/16	1.20	1.79	5,500	2.49	6,110	2.77
	1/4	6	3/4	1.7	2.6	8,000	3.63	8,880	4.0
	5/16	8	15/16	2.6	3.8	11,700	5.31	12,990	5.9
	3/8	9	1-1/8	3.6	5.3	17,500	7.94	19,440	8.8
	7/16	11	1-1/4	4.8	7.1	22,000	10.0	24,400	11.1
	1/2	12	1-1/2	6.1	9.1	30,500	13.8	33,800	15.4
	9/16	14	1-3/4	7.6	11.3	36,500	16.6	40,500	18.4
	5/8	16	2	9.4	14.1	47,800	21.7	53,100	24.1
	3/4	18	2-1/4	13.5	20.1	61,800	28.0	68,600	31.1
	13/16	20	2-1/2	15.8	23.5	74,000	33.6	82,200	37.3
	7/8	22	2-3/4	18.5	27.5	84,300	38.2	93,600	42.5
	1	24	3	23.7	35.3	105,000	47.6	116,600	52.9
	1-1/16	26	3-1/4	26.9	40.0	121,600	55.1	135,000	61.3
	1-1/8	28	3-1/2	30.3	45.1	137,000	62.1	152,200	69.0
	1-1/4	30	3-3/4	37.2	55.4	157,000	71.2	174,400	79.1
	1-5/16	32	4	41.1	61.2	176,400	80.0	195,900	88.9
	1-1/2	36	4-1/2	53.8	80.1	215,000	97.5	238,800	108.3
12x12 Strand	1-5/8	40	5	62.0	92.2	245,000	111	272,100	123
	1-3/4	44	5-1/2	72.3	107.6	284,300	129	315,800	143
	2	48	6	94.9	141.3	369,900	168	410,900	186
	2-1/8	52	6-1/2	108.9	162.0	423,900	192	470,900	214
	2-1/4	56	7	121.3	180.5	470,100	213	522,200	237
	2-1/2	60	7-1/2	147.9	220.2	569,400	258	632,600	287
	2-5/8	64	8	163.8	243.8	630,300	286	700,200	318
	2-3/4	68	8-1/2	182.4	271.5	698,400	317	775,900	352
	3	72	9	215.4	320.6	819,000	371	909,900	413
	3-1/8	76	9-1/2	233.2	347.0	886,500	402	984,900	447
	3-1/4	80	10	253.5	377.4	961,300	436	1,068,000	484
	3-1/2	84	10-1/2	290.7	432.7	1,095,300	497	1,216,800	552
	3-5/8	88	11	314.1	467.6	1,184,300	537	1,315,700	597
	3-3/4	92	11-1/2	338.7	504.1	1,273,100	577	1,414,400	641
	4	96	12	383.5	570.8	1,435,200	651	1,594,500	723
	4-1/8	100	12-1/2	407.0	605.8	1,523,400	691	1,692,400	768
	4-1/4	104	13	433.4	645.0	1,618,600	734	1,798,200	816

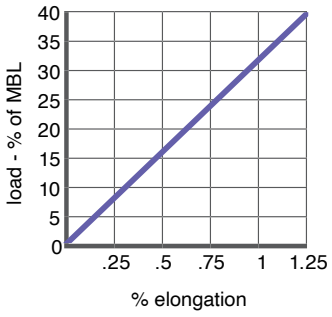
Tensile Strengths are determined in accordance with Cordage Institute CI 1500-02. Test Methods for Fiber Rope. Minimum Tensile Strength (MTS) published assumes spliced eye terminations at each end of the rope. Weights actually calculated at linear density under stated preload ($200d^2$) plus 4%. Diameter and circumference size published is nominal and reflects rope size after loading (10 cycles) to 50% of MTS.

Technical Information

Specific gravity	**0.98***
Melting point	**284°F (140°C)**
Critical temp.	**150°F (65°C)**
Coefficient of friction	**0.09–0.12***
Elongation at break	**3%–4%**
Fiber water absorption	**0%**
UV resistance	**good**
Wet abrasion resistance	**superior**
Dry abrasion resistance	**superior**

* value based on data supplied by the fiber manufacturer for new, dry fiber

Toro® Elongation (%)



Type approved product

DNV·GL

Contact Us

Cortland continues to use advances in technology and engineering to provide innovative synthetic fiber solutions. Please email cortland@cortlandcompany.com for an initial discussion on Toro® rope, or visit us online at cortlandcompany.com.

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