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S P M
HAWSERS
TOWING
LINES
MOORING
ROPES



A BUSINESS OF CONNECTIONS

CSL is a Brazilian company internationally acknowledged as a leading synthetic fibre rope manufacturer. For over eight decades, it has been specially committed to the quality of products and services provided, making sure its customers exceeded their expectations and that long lasting connections were built.

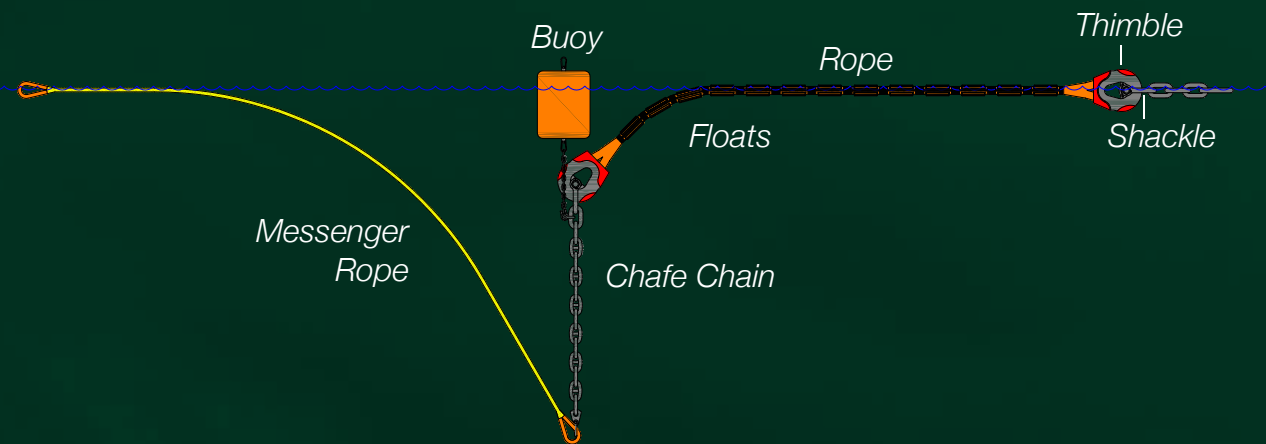
*Anchored in its tradition and experience and driven by new technologies, **CSL** walks towards the future, investing in the continuous improvement of its solution line in order to meet the increasingly demanding world market.*



1 SPM HAWSERS



A COMPLETE SOLUTION



CSL provides custom made hawser systems including rope, connectors (shackles and thimbles), floats, chafe chains, buoys as well as other hardware that may be requested by monobuoys' and FPSO's operators.

1. The average breaking strength presented in the following pages reflect CSL's historical data
2. Dimensional tolerance of +/- 5%
3. Upon request ropes can be manufactured on different sizes and supplied with optionals and accessories
4. The ropes are manufactured according to ISO 9554, ISO ABNT NBR 2307 and OCIMF Guidelines
5. All data is subject to change without prior notice

SPM HAWSER SYSTEMS

VICTOR

THE NEXT GENERATION
IN MOORING HAWSERS

Circumference at load		Nominal diameter	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	tons	tons	tons
6	48	164	48	53	
7	56	223	65	72	
8	64	291	85	94	
9	72	368	107	118	
10	80	454	132	145	
11	88	550	159	175	
12	96	654	188	207	
13	104	768	220	242	
14	112	890	254	279	
15	120	1022	291	320	
16	128	1165	330	363	
17	136	1318	373	410	
18	144	1470	416	458	
19	152	1649	464	510	
20	160	1827	513	564	
21	168	2005	561	617	
22	176	2209	618	680	
23	184	2412	675	743	
24	192	2615	732	805	
25	200	2848	794	873	
26	208	3082	857	943	
27	216	3315	920	1012	
28	224	3574	991	1090	
29	232	3832	1061	1167	
30	240	4090	1132	1245	
31	248	4364	1210	1331	
32	256	4638	1288	1417	
33	264	4911	1366	1503	

ISO 10554 and 10547



PU COATING DISPENSATION
Very high UV and abrasion resistance

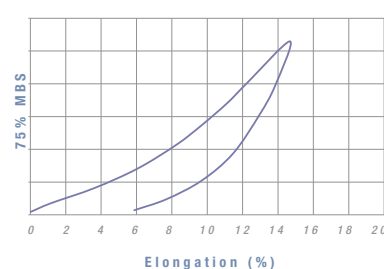
SUPERIOR ABRASION RESISTANCE

ADDITIONAL INFORMATION

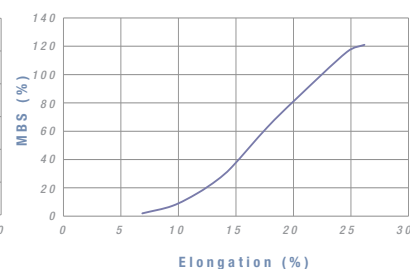
VICTOR has a special design that allows the highest abrasion and UV resistance among its category. It is the next generation in mooring hawsers.

- | | |
|---------------------|------------------------|
| Specific gravity | 1.24 g/cm ³ |
| UV resistance | Very high |
| Abrasion resistance | Very high |
| Elongation | Very high |
| Shock absorption | Very high |
| Splicing | Difficult |
| Color | Natural (white) |
| Water absorption | <4.5% |
| Floatability | Negative |

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST



VICTOR combines CSL's long expertise with heavy duty ropes and field mooring knowledge. Superior abrasion and UV resistance allow longer life and performance. Its special jacket perfectly acts as a substitute for polyurethane protective coatings.

It is the natural successor of Double Braided and Circular Nylon ropes for Single Point Moorings.

NYLON 2_{IN}1

DOUBLE BRAIDED NYLON

Circumference at load	Nominal diameter	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	tons	tons
6	48	143	50	59
7	56	195	68	89
8	64	255	88	104
9	72	322	112	132
10	80	398	138	165
11	88	482	166	200
12	96	573	198	238
13	104	673	231	276
14	112	780	268	324
15	120	893	308	370
16	128	1020	350	420
17	136	1155	396	475
18	144	1290	443	530
19	152	1447	495	588
20	160	1603	547	648
21	168	1760	599	720
22	176	1937	660	783
23	184	2113	721	856
24	192	2290	782	938
25	200	2493	849	1007
26	208	2697	917	1089
27	216	2900	984	1180
28	224	3127	1061	1259
29	232	3353	1137	1350
30	240	3580	1213	1455
31	248	3823	1298	1540
32	256	4065	1382	1641
33	264	4308	1467	1743

ISO 10554

NYLON CIRCULAR 11

Circumference at load	Nominal diameter	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	tons	tons
8	64	263	124	136
9	72	333	157	173
10	80	411	193	221
11	88	498	233	266
12	96	592	277	310
13	104	695	324	356
14	112	806	375	413
15	120	923	431	474
16	128	1054	490	539
17	136	1193	555	621
18	144	1333	620	690
19	152	1495	692	761
20	160	1657	765	842
21	168	1819	838	922
22	176	2001	924	1016
23	184	2184	1009	1110
24	192	2366	1095	1205
25	200	2576	1189	1308
26	208	2787	1283	1411
27	216	2997	1378	1516
28	224	3231	1485	1634
29	232	3465	1592	1751
30	240	3699	1699	1869
31	248	3950	1817	1999
32	256	4201	1935	2129
33	264	4452	2053	2258



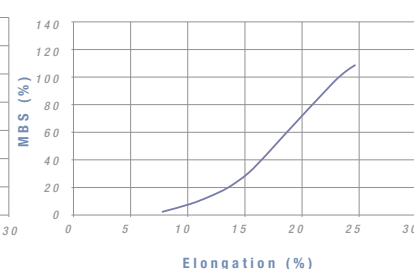
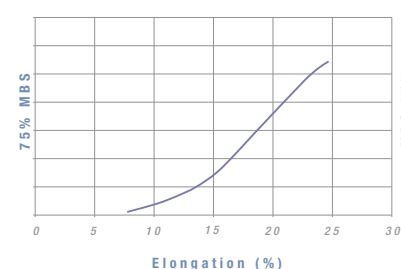
ADDITIONAL INFORMATION

This is the industry standard for Single Point Moorings due to its very high shock absorption and fatigue resistance. Recommended for stressing environments.

- Specific gravity: 1.14 g/cm³
- UV resistance: High
- Abrasion resistance: Very high
- Elongation: Very high
- Shock absorption: Very high
- Splicing: Difficult
- Color: Natural (white)
- Water absorption: <9%
- Floatability: Negative

WET BREAKING TEST AT 75% MBS

DRY BREAKING TEST



ADDITIONAL INFORMATION

A perfectly round rope designed to have superior breaking strength and controlled elongation. This product has high fatigue performance and satisfactory shock absorption. The best option for calm waters.

- Specific gravity: 1.14 g/cm³
- UV resistance: High
- Abrasion resistance: Very high
- Elongation: High
- Shock absorption: Regular
- Splicing: Difficult
- Color: Natural (white)
- Water absorption: <9%
- Floatability: Negative

OPTIONALS

Grommet construction

Double rope with no end and approximately 170% of the single rope efficiency



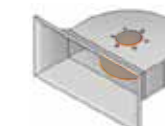
SPM



Tubular



Rotative

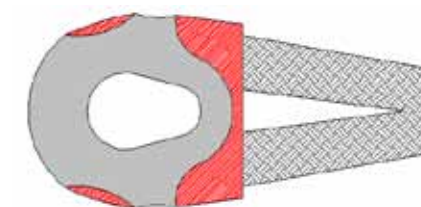


Bellmouth

Thimbles

Polyurethane coating

Increase of rope's abrasion and UV resistance

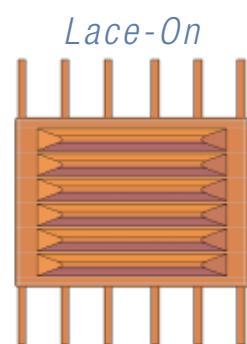


Thimble encapsulation

Fixes the rope into the thimble, allowing better handling and higher abrasion resistance

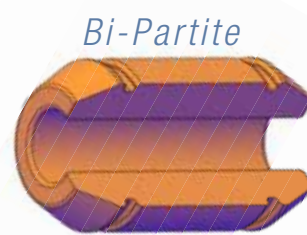
Floats

Lace-On: Expanded polyethylene wrapped on high performance polyester fabric and laced around the rope



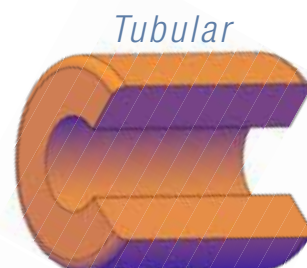
Lace-On

Bi-Partite: Expanded closed-cell polyurethane with plastic encasement in a bi-partite piece

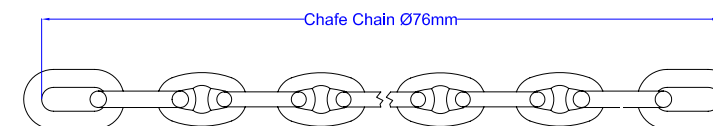


Bi-Partite

Tubular: Expanded closed-cell polyurethane with plastic encasement in only one piece



Tubular



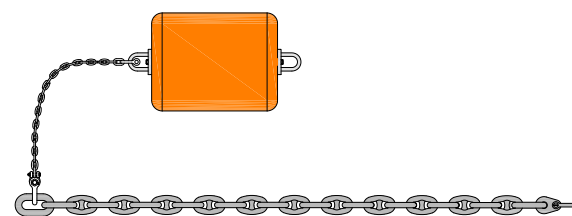
Chafe Chain Ø76mm

Chafe chains

Chafe chains "A" and "B" (as per OCIMF 2007) connect the hawser line to oil tankers, monobuoys and FPSOs

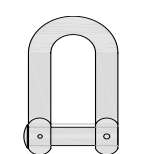
Support buoy

Commonly used to give floatation support to the chafe chains on SPM systems installed in deep waters

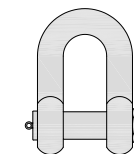


Chain through buoy

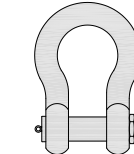
Mostly recommended to help the floatation to the chafe chains on SPM systems used on shallow waters, avoiding the chafe chain to entangle the monobuoy chains



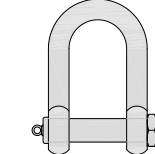
Flush Pin D Type



D Type



Bow Type



Heavy Duty

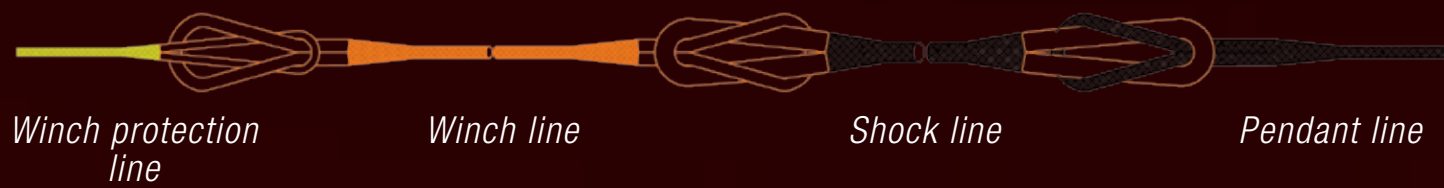
Shackles

Most commonly used as a connection between the rope and the chafe chain

Other optionals may be available upon request

2 TOWING LINES





CSL recommends

Winch protection line
12 or 8 strand PP Multi rope

Winch line
12-Strand or Double Braided HMPE rope

Shock line
12-Strand or Double Braided Nylon rope

Pendant Line
12-Strand or Double Braided HMPE rope

1. The average breaking strength presented in the following pages reflect CSL's historical data
2. Dimensional tolerance of +/- 5%
3. Upon request ropes can be manufactured on different sizes and supplied with optionals and accessories
4. The ropes are manufactured according to ISO 9554, ISO ABNT NBR 2307 and OCIMF Guidelines
5. All data is subject to change without prior notice

Maritime towing operations demand a line composed of different ropes, combining particular characteristics into the same structure.

Due to its outstanding properties, HMPE has been widely used as a substitute for steel wire ropes. With the same breaking resistance and 1/7th of its weight, HMPE provides great handling, ensures safer operations and allows the use of smaller winches.



TOWING LINES

BRAVISSIMO

DOUBLE BRAIDED HMPE

Circumference at load	Nominal diameter	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	tons	tons
6	48	136	148	163
7	56	185	201	221
8	64	240	264	290
9	72	305	333	366
10	80	375	414	455
11	88	450	492	541
12	96	530	576	634
13	104	622	674	741
14	112	721	781	859
15	120	826	897	987
16	128	943	1019	1121
17	136	1068	1154	1269
18	144	1193	1289	1418
19	152	1338	1440	1584
20	160	1483	1592	1751
21	168	1628	1743	1917
22	176	1791	1921	2113
23	184	1955	2100	2310
24	192	2118	2278	2506
25	200	2306	2474	2721
26	208	2494	2670	2937
27	216	2682	2866	3153
28	224	2892	3089	3398
29	232	3102	3311	3642
30	240	3311	3534	3887
31	248	3536	3780	4158
32	256	3760	4026	4429
33	264	3985	4271	4698

ISO 10325

BRAVO12 19

12-STRAND HMPE

Circumference at load	Nominal diameter	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	tons	tons
1 1/4	10	6	9.4	10.8
1 1/2	12	9	13.5	15.5
1 3/4	14	12	18.4	21
2	16	15	24	28
2 1/4	18	19	29	33
2 1/2	20	23	35	40
2 3/4	22	28	41	47
3	24	33	48	55
3 1/4	26	38	55	63
3 1/2	28	45	62	72
3 3/4	30	51	70	81
4	32	58	80	91
4 1/4	34	65	88	101
4 1/2	36	72	96	110
4 3/4	38	80	106	122
5	40	88	115	132
5 1/2	44	106	134	154
6	48	125	156	179
6 1/2	52	146	180	207
7	56	169	207	238
7 1/2	60	193	232	267
8	64	220	261	300
8 1/2	68	248	291	334
9	72	278	323	372
9 1/2	76	309	357	410
10	80	343	395	454
11	88	417	477	549
12	96	497	567	652

ISO 10325



STEEL WIRE REPLACEMENT
As strong as steel, 7x lighter.

SUPERIOR ABRASION RESISTANCE

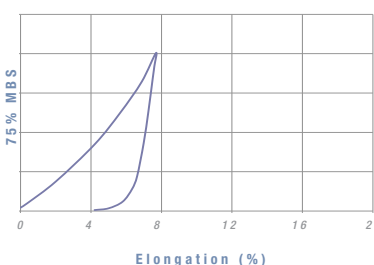
STEEL WIRE REPLACEMENT
As strong as steel, 7x lighter.

ADDITIONAL INFORMATION

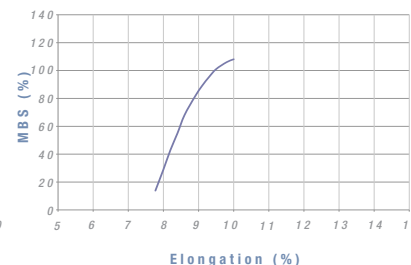
As strong as steel, 7x lighter.
Bravissimo is an HMPE rope projected in double braided construction, which provides increased abrasion and UV resistance. Its perfectly round design ensures excellent fitting on drums.

- Specific gravity: 0.97 g/cm³
- UV resistance: High
- Abrasion resistance: Very high
- Elongation: Very low
- Shock absorption: Very low
- Splicing: Difficult
- Color: Orange
- Water absorption: 0%
- Floatability: Positive

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST

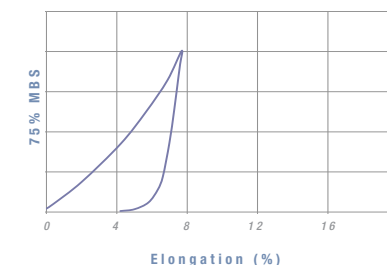


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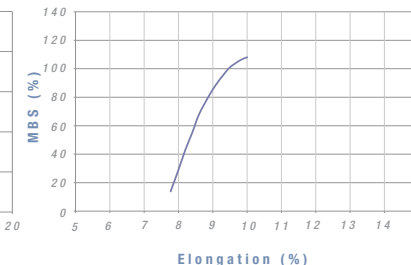
As strong as steel, 7x lighter.
Bravo 12 is a safe, efficient and easy to splice wire substitute on pendant and winch applications.

- Specific gravity: 0.97 g/cm³
- UV resistance: High
- Abrasion resistance: High
- Elongation: Very low
- Shock absorption: Very low
- Splicing: Not difficult
- Color: Orange
- Water absorption: 0%
- Floatability: Positive

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST



MFP8

8-STRAND MULTIFILAMENT POLYPROPYLENE

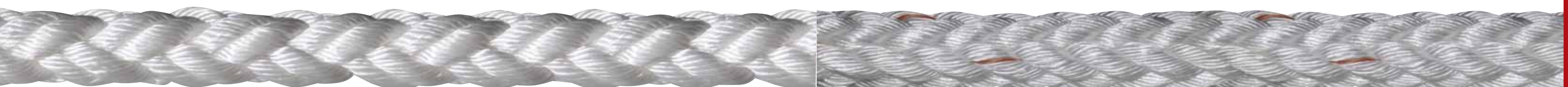
Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	15	33	4.4	5.2
2 1/2	20	18	40	5.4	6.3
2 3/4	22	22	48	6.5	7.6
3	24	26	57	7.7	8.9
3 1/4	26	31	68	8.9	10.4
3 1/2	28	35	77	10.2	11.9
3 3/4	30	41	90	11.4	13.4
4	32	46	101	13.5	15.7
4 1/2	36	59	130	16.3	19.1
5	40	72	158	20	24
5 1/2	44	88	194	24	28
6	48	104	229	29	34
6 1/2	52	122	268	34	40
7	56	142	312	38	45
7 1/2	60	163	359	43	51
8	64	185	407	50	58
9	72	234	515	61	72
10	80	289	636	77	90
11	88	350	770	92	107
12	96	417	917	108	127
13	104	489	1076	128	149
14	112	567	1247	143	167
15	120	651	1432	163	191
16	128	741	1630	194	227
17	136	836	1839	216	253
18	144	937	2061	241	282

ISO 1346

12-STRAND MULTIFILAMENT POLYPROPYLENE

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	15	33	4.7	5.5
2 1/2	20	18	40	5.7	6.7
2 3/4	22	22	48	6.9	8.1
3	24	26	57	8.1	9.5
3 1/4	26	31	68	9.5	11.1
3 1/2	28	35	77	10.8	12.6
3 3/4	30	41	90	12.0	14.1
4	32	46	101	14.3	16.7
4 1/2	36	59	130	17.3	20
5	40	72	158	21	25
5 1/2	44	88	194	26	30
6	48	104	229	31	36
6 1/2	52	122	268	36	42
7	56	142	312	41	48
7 1/2	60	163	359	46	54
8	64	185	407	51	60
9	72	234	515	64	75
10	80	289	636	82	96
11	88	350	770	97	113
12	96	417	917	114	134
13	104	489	1076	135	158
14	112	567	1247	153	179
15	120	651	1432	173	203
16	128	741	1630	204	239
17	136	836	1839	228	267
18	144	937	2061	255	298

ISO 1346

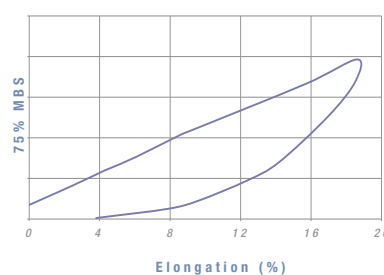


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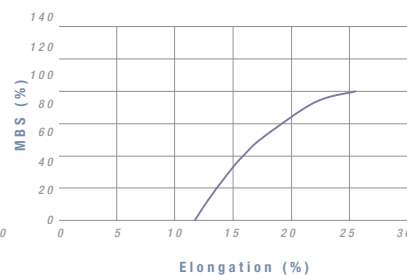
Increase the life of your HMPE lines by using PP ropes as a protection to winches' abrasion. These ropes are easier to splice and have higher elongation than 12-Strand ropes.

Specific gravity	0.91 g/cm ³
UV resistance	Regular
Abrasion resistance	High
Elongation	Very high
Shock absorption	Regular
Splicing	Simple
Color	Natural (white)
Water absorption	0%
Floatability	Positive

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST

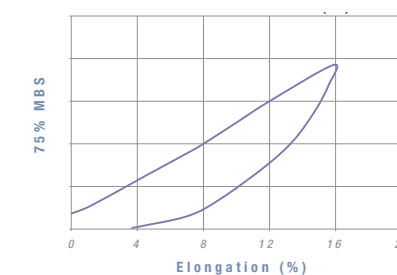


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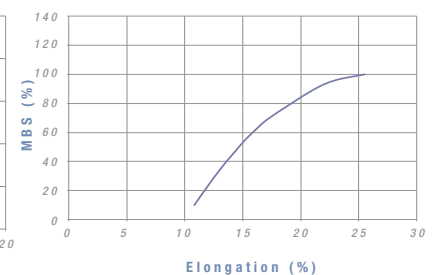
An excellent option for protecting HMPE ropes from winch abrasion. It is rounder than the 8-Strand ones, assuring a better performance when in contact with sharper edges.

Specific gravity	0.91 g/cm ³
UV resistance	Regular
Abrasion resistance	High
Elongation	Very high
Shock absorption	Regular
Splicing	Not difficult
Color	Natural (white)
Water absorption	0%
Floatability	Positive

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST



MFP12

NYLON2_{IN1}

DOUBLE BRAIDED NYLON

Circumference at load	Nominal diameter	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	tons	tons
6	48	143	50	59
7	56	195	68	89
8	64	255	88	104
9	72	322	112	132
10	80	398	138	165
11	88	482	166	200
12	96	573	198	238
13	104	673	231	276
14	112	780	268	324
15	120	893	308	370
16	128	1020	350	420
17	136	1155	396	475
18	144	1290	443	530
19	152	1447	495	588
20	160	1603	547	648
21	168	1760	599	720
22	176	1937	660	783
23	184	2113	721	856
24	192	2290	782	938
25	200	2493	849	1007
26	208	2697	917	1089
27	216	2900	984	1180
28	224	3127	1061	1259
29	232	3353	1137	1350
30	240	3580	1213	1455
31	248	3823	1298	1540
32	256	4065	1382	1641
33	264	4308	1467	1743

ISO 10554

NYLON12₂₃

12-STRAND NYLON

Circumference at load	Nominal diameter	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	tons	tons
2 1/4	18	21	7.2	8.8
2 1/2	20	25	8.7	10.6
2 3/4	22	31	10.3	12.6
3	24	36	12.0	14.7
3 1/4	26	43	14.2	17.3
3 1/2	28	49	16.3	19.9
3 3/4	30	56	18.4	23
4	32	64	22	27
4 1/2	36	81	27	33
5	40	100	32	39
5 1/2	44	121	38	47
6	48	144	46	56
6 1/2	52	170	54	66
7	56	197	61	75
7 1/2	60	226	68	83
8	64	257	77	93
9	72	325	97	118
10	80	401	120	147
11	88	486	143	174
12	96	578	173	212
13	104	678	194	236
14	112	787	228	279
15	120	903	255	311
16	128	1010	286	348
17	136	1160	321	392
18	144	1300	362	442

ISO 1140



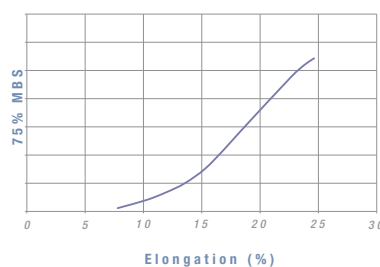
SUPERIOR ABRASION RESISTANCE

ADDITIONAL INFORMATION

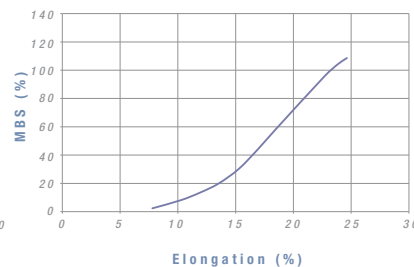
The most durable solution for shock lines due to its increased abrasion and UV resistance.

Specific gravity	1.14 g/cm ³
UV resistance	High
Abrasion resistance	Very high
Elongation	Very high
Shock absorption	Very high
Splicing	Difficult
Color	Natural (white)
Water absorption	<9%
Floatability	Negative

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST

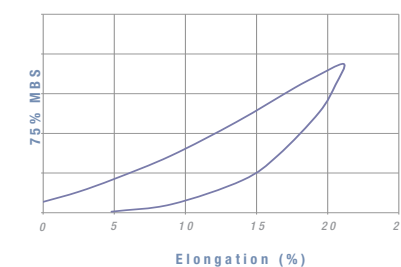


ADDITIONAL INFORMATION

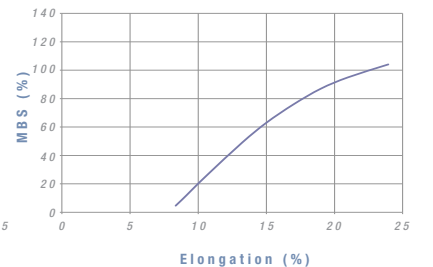
An easy to splice and high shock absorbing solution for shock lines.

Specific gravity	1.14 g/cm ³
UV resistance	High
Abrasion resistance	High
Elongation	Very high
Shock absorption	Very high
Splicing	Not difficult
Color	Natural (white)
Water absorption	<9%
Floatability	Negative

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST



3 MOORINGROPES



High Performance Ropes

As strong as steel but 7x lighter. These ropes are made of high modulus polyethylene and have outperforming breaking resistance, low elastic elongation (similar to wire) and good response to abrasion. A great choice for high responsibility moorings and for steel substitution in applications that demand low weight, good handling, superior safety, no rusting and/or positive floatability.

STEEL WIRE REPLACEMENT
As strong as steel, 7x lighter.

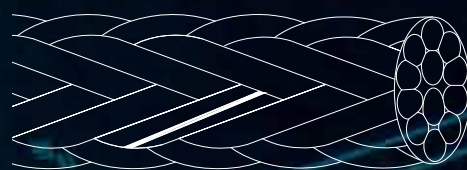
Double Braids

Double braided ropes provide ideal elongation and resistance to fight stressing maritime environments. Its design preserves the rope properties when exposed to abrasion and UV action. This product is entirely manufactured in accordance with OCIMF Guidelines.



12-Strand

12-Strand ropes have a rounded construction, are non-rotative and do not distort or kink. It is very similar to 8 Strand ones, but with a higher abrasion and traction resistance.

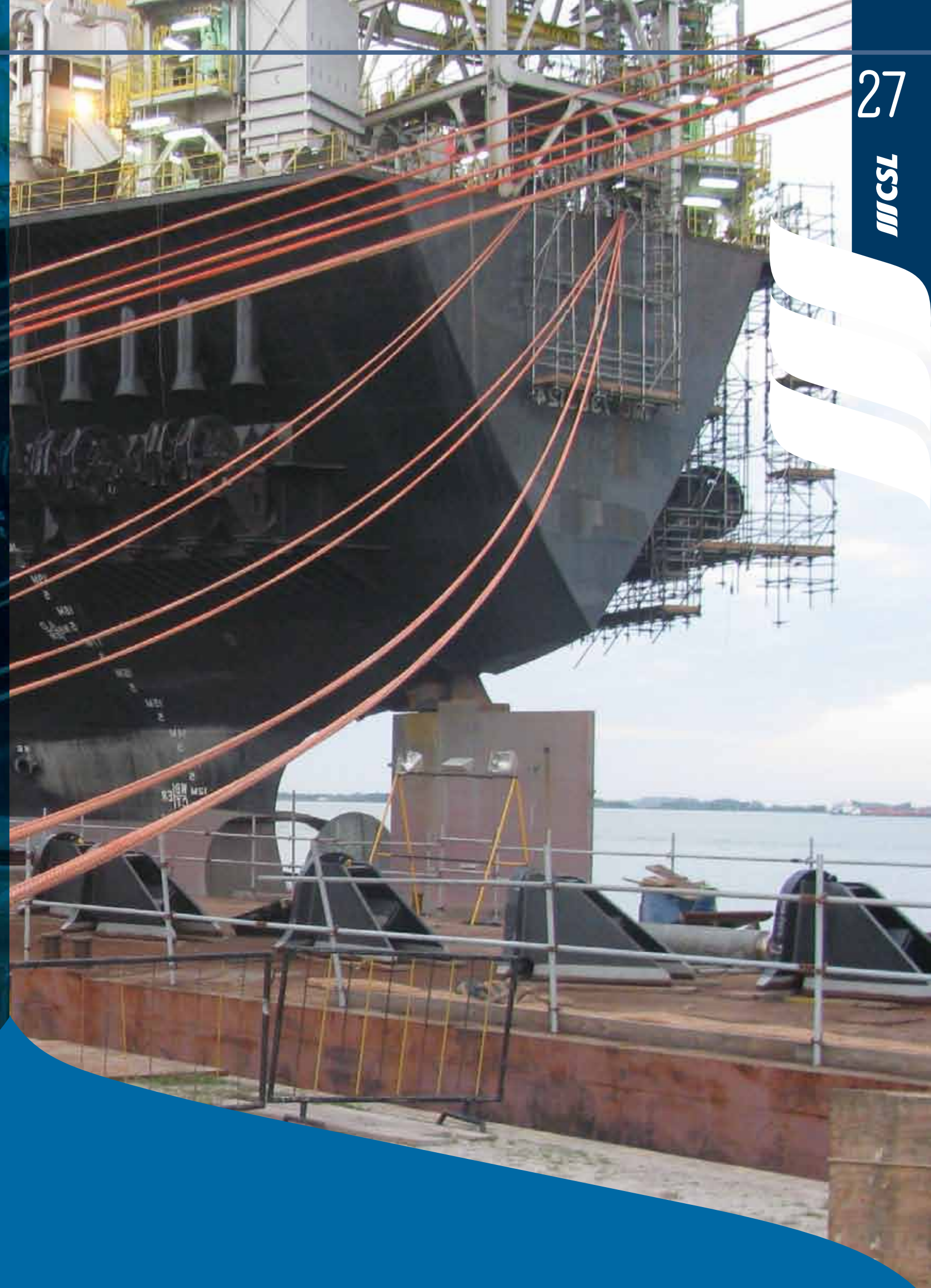


8-Strand

A squared and non rotative design that does not distort or kink. It is a practical and efficient solution with a less complex splicing than 12 Strands and Double Braids, besides having higher shock absorption and elongation.



1. The average breaking strength presented in the following pages reflect CSL's historical data
2. Dimensional tolerance of +/- 5%
3. Upon request ropes can be manufactured on different sizes and supplied with optionals and accessories
4. The ropes are manufactured according to ISO 9554, ISO ABNT NBR 2307 and OCIMF Guidelines
5. All data is subject to change without prior notice



MOORING ROPES

BRAVO12

12 - STRAND HMPE

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
1 3/4	14	12	26	18	21
2	16	15	34	24	28
2 1/4	18	19	42	29	33
2 1/2	20	23	51	35	40
2 3/4	22	28	62	41	47
3	24	33	73	48	55
3 1/4	26	38	84	55	63
3 1/2	28	45	99	62	72
3 3/4	30	51	112	70	81
4	32	58	128	80	92
4 1/4	34	65	143	89	101
4 1/2	36	72	158	96	110
4 3/4	38	80	176	106	122
5	40	88	194	115	133
5 1/2	44	106	233	134	154
6	48	125	275	156	180
6 1/2	52	146	321	181	208
7	56	169	372	207	238
7 1/2	60	193	425	233	267
8	64	220	484	261	300
8 1/2	68	248	546	291	334
9	72	278	612	323	372
9 1/2	76	309	680	357	410
10	80	343	755	395	454
11	88	417	917	477	549
12	96	497	1093	567	652

ISO 10325

BRAVISSIMO 29

DOUBLE BRAIDED HMPE

Circumference at load	Nominal diameter	Nominal mass at load	Minimum breaking strength	Average breaking strength
mm	inches	kg/100m	tons	tons
48	6	136	148	163
56	7	185	201	221
64	8	240	264	290
72	9	305	333	366
80	10	375	414	455
88	11	450	492	541
96	12	530	576	634
104	13	622	674	741
112	14	721	781	859
120	15	826	897	987
128	16	943	1019	1121
136	17	1068	1154	1269
144	18	1193	1289	1418
152	19	1338	1440	1584
160	20	1483	1592	1751
168	21	1628	1743	1917
176	22	1791	1921	2113
184	23	1955	2100	2310
192	24	2118	2278	2506
200	25	2306	2474	2721
208	26	2494	2670	2937
216	27	2682	2866	3153
224	28	2892	3089	3398
232	29	3102	3311	3642
240	30	3311	3534	3887
248	31	3536	3780	4158
256	32	3760	4026	4429
264	33	3985	4271	4698

ISO 10375



STEEL WIRE REPLACEMENT
As strong as steel, 7x lighter.

SUPERIOR ABRASION RESISTANCE

STEEL WIRE REPLACEMENT
As strong as steel, 7x lighter.

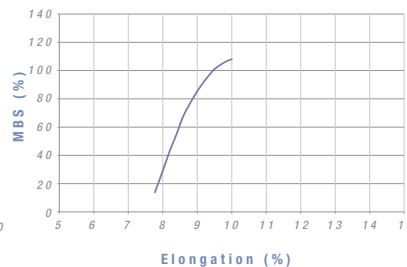
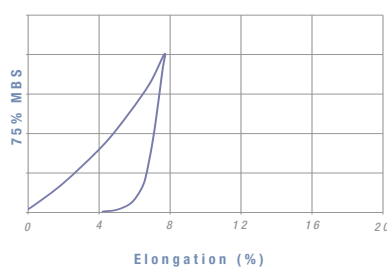
ADDITIONAL INFORMATION

As strong as steel, 7x lighter.
A floating, easy to splice and extremely strong line with similar elastic elongation as wire. A recommended solution for high responsibility mooring operations.

- | | |
|---------------------|------------------------|
| Specific gravity | 0.97 g/cm ³ |
| UV resistance | High |
| Abrasion resistance | High |
| Elongation | Very low |
| Shock absorption | Very low |
| Splicing | Not difficult |
| Melting point | 147°C |
| Color | Orange |
| Water absorption | 0% |
| Floatability | Positive |

WET BREAKING TEST AT 75% MBS

DRY BREAKING TEST



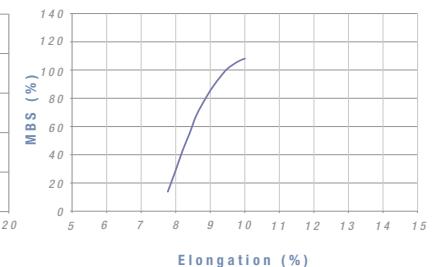
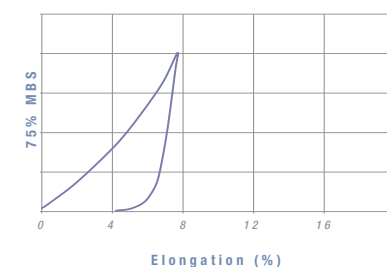
ADDITIONAL INFORMATION

As strong as steel, 7x lighter.
HMPE rope with increased abrasion resistance due to its design with a perfectly round and firm braided jacket. A recommended solution for high responsibility mooring operations.

- | | |
|---------------------|------------------------|
| Specific gravity | 0.97 g/cm ³ |
| UV resistance | High |
| Abrasion resistance | Very high |
| Elongation | Very low |
| Shock absorption | Very low |
| Splicing | Difficult |
| Melting point | 147°C |
| Color | Orange |
| Water absorption | 0% |
| Floatability | Positive |

WET BREAKING TEST AT 75% MBS

DRY BREAKING TEST



VICTOR

SPECIALLY DESIGNED SOLUTION

Circumference at load	Nominal diameter	Nominal mass at load	Minimum breaking strenght	Average breaking strenght
inches	mm	kg/100m	tons	tons
6	48	164	48	53
7	56	223	65	72
8	64	291	85	94
9	72	368	107	118
10	80	454	132	145
11	88	550	159	175
12	96	654	188	207
13	104	768	220	242
14	112	890	254	279
15	120	1022	291	320
16	128	1165	330	363
17	136	1318	373	410
18	144	1470	416	458
19	152	1649	464	510
20	160	1827	513	564
21	168	2005	561	617
22	176	2209	618	680
23	184	2412	675	743
24	192	2615	732	805
25	200	2848	794	873
26	208	3082	857	943
27	216	3315	920	1012
28	224	3574	991	1090
29	232	3832	1061	1167
30	240	4090	1132	1245
31	248	4364	1210	1331
32	256	4638	1288	1417
33	264	4911	1366	1503

ISO 10554 and 10547

NYLON²_{IN1}

31

JJCSL

DOUBLE BRAIDED NYLON

Circumference at load	Nominal diameter	Nominal mass at load	Minimum breaking strenght	Average breaking strenght
inches	mm	kg/100m	tons	tons
6	48	143	50	59
7	56	195	68	89
8	64	255	88	104
9	72	322	112	132
10	80	398	138	165
11	88	482	166	200
12	96	573	198	238
13	104	673	231	276
14	112	780	268	324
15	120	893	308	370
16	128	1020	350	420
17	136	1155	396	475
18	144	1290	443	530
19	152	1447	495	588
20	160	1603	547	648
21	168	1760	599	720
22	176	1937	660	783
23	184	2113	721	856
24	192	2290	782	938
25	200	2493	849	1007
26	208	2697	917	1089
27	216	2900	984	1180
28	224	3127	1061	1259
29	232	3353	1137	1350
30	240	3580	1213	1455
31	248	3823	1298	1540
32	256	4065	1382	1641
33	264	4308	1467	1743

ISO 10554

SUPERIOR ABRASION RESISTANCE

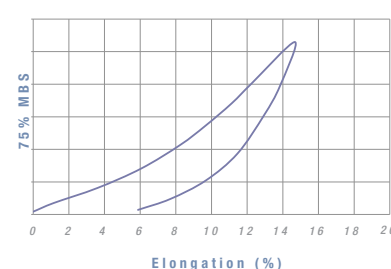
SUPERIOR ABRASION RESISTANCE

ADDITIONAL INFORMATION

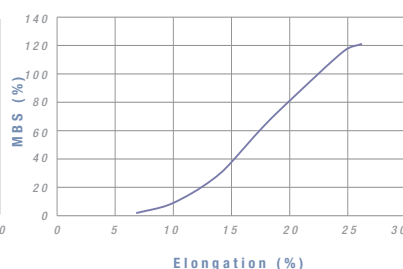
VICTOR has the highest abrasion and UV resistance among its category. Developed inside CSL's lab, it was specially designed for durability and performance.

Specific gravity	1.24 g/cm ³
UV resistance	Very high
Abrasion resistance	Very high
Elongation	Very high
Shock absorption	Very high
Splicing	Difficult
Melting point	238°C
Color	Natural (white)
Water absorption	<4.5%
Floatability	Negative

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST

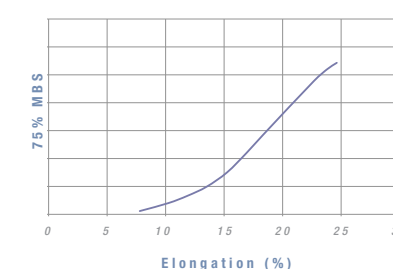


ADDITIONAL INFORMATION

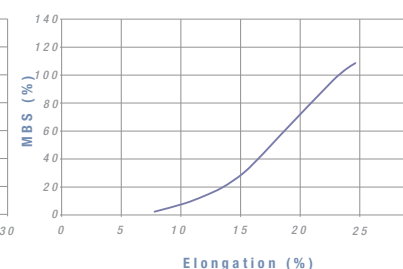
An excellent choice when fatigue resistance and shock absorption are necessary. This 100% nylon made line presents a core and cover assuring superior abrasion performance.

Specific gravity	1.14 g/cm ³
UV resistance	High
Abrasion resistance	High
Elongation	Very high
Shock absorption	Very high
Splicing	Difficult
Melting point	238°C
Color	Natural (white)
Water absorption	<9%
Floatability	Negative

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST



POLYESTER₁₂

12 - STRAND POLYESTER

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	25	55	5.6	6.8
2 1/2	20	30	66	6.8	8.3
2 3/4	22	37	81	8.3	10.1
3	24	44	97	9.7	11.8
3 1/4	26	52	114	11.2	13.7
3 1/2	28	60	132	12.8	15.5
3 3/4	30	68	150	14.3	17.4
4	32	78	172	16.3	19.9
4 1/2	36	98	216	21	25
5	40	121	266	26	31
5 1/2	44	147	323	31	37
6	48	175	385	36	44
6 1/2	52	205	451	44	53
7	56	238	524	49	59
7 1/2	60	273	601	54	66
8	64	311	684	61	75
9	72	393	865	77	93
10	80	486	1069	97	118
11	88	588	1294	114	139
12	96	699	1538	135	164
13	104	821	1806	163	199
14	112	952	2094	184	224
15	120	1090	2398	204	249
16	128	1240	2728	241	294
17	136	1400	3080	270	330
18	144	1570	3454	306	373

ISO 1141

NYLON₁₂

12 - STRAND NYLON

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	21	46	7.2	8.8
2 1/2	20	25	55	8.7	10.6
2 3/4	22	31	68	10.4	12.6
3	24	36	79	12.0	14.7
3 1/4	26	43	95	14.2	17.3
3 1/2	28	49	108	16.3	19.9
3 3/4	30	56	123	18.4	23
4	32	64	141	22	27
4 1/2	36	81	178	27	33
5	40	100	220	32	39
5 1/2	44	121	266	38	47
6	48	144	317	46	56
6 1/2	52	170	374	54	66
7	56	197	433	61	75
7 1/2	60	226	497	68	83
8	64	257	565	77	93
9	72	325	715	97	118
10	80	401	882	120	147
11	88	486	1069	143	174
12	96	578	1272	174	212
13	104	678	1492	194	236
14	112	787	1731	229	279
15	120	903	1987	255	311
16	128	1010	2222	286	348
17	136	1160	2552	322	392
18	144	1300	2860	362	442

ISO 1140

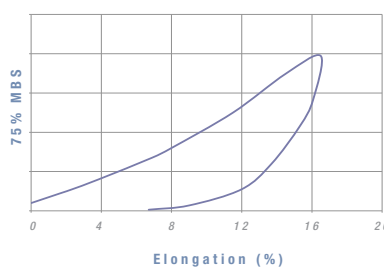


ADDITIONAL INFORMATION

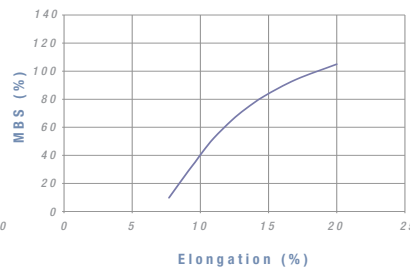
The best option when UV resistance, breaking strength and abrasion performance are required. Made with high tenacity polyester fiber, this rope has a very good fatigue response and shock absorption.

Specific gravity	1.38 g/cm ³
UV resistance	Very high
Abrasion resistance	High
Elongation	Regular
Shock absorption	Low
Splicing	Not difficult
Melting point	265°C
Color	Natural (white)
Water absorption	<1%
Floatability	Negative

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST

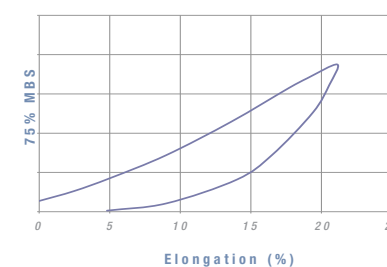


ADDITIONAL INFORMATION

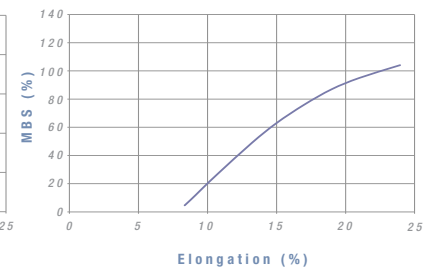
Fatigue performance and shock absorption are the core values of this 12-Strand rope specially designed to resist to the most stressing environments.

Specific gravity	1.14 g/cm ³
UV resistance	High
Abrasion resistance	High
Elongation	Very high
Shock absorption	Very high
Splicing	Not difficult
Melting point	238°C
Color	Natural (white)
Water absorption	<9%
Floatability	Negative

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST



COMPOSITE12

12-STRAND PP/PES

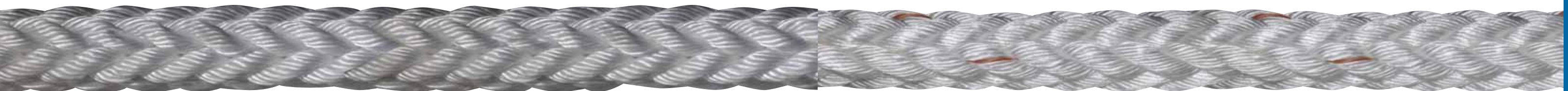
Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	18	39	6.4	8.1
2 1/2	20	22	49	7.8	9.9
2 3/4	22	27	59	9.3	11.8
3	24	32	70	10.9	13.9
3 1/4	26	37	82	12.8	16.2
3 1/2	28	43	95	14.7	18.6
3 3/4	30	50	110	16.8	21
4	32	57	125	19.0	24
4 1/2	36	72	158	24	30
5	40	89	195	29	37
5 1/2	44	107	235	35	44
6	48	127	279	42	52
6 1/2	52	150	330	48	61
7	56	173	381	56	70
7 1/2	60	199	438	64	80
8	64	227	499	72	91
9	72	287	631	90	114
10	80	354	779	109	139
11	88	428	942	132	167
12	96	510	1122	155	197
13	104	600	1320	181	229
14	112	690	1518	208	264
15	120	796	1751	238	302
16	128	906	1993	268	341
17	136	1020	2244	302	383
18	144	1150	2530	337	427

ISO 10566

12-STRAND MULTIFILAMENT POLYPROPYLENE

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	15	33	4.7	5.5
2 1/2	20	18	40	5.7	6.7
2 3/4	22	22	48	6.9	8.1
3	24	26	57	8.1	9.5
3 1/4	26	31	68	9.5	11.1
3 1/2	28	35	77	10.8	12.6
3 3/4	30	41	90	12.0	14.1
4	32	46	101	14.2	16.7
4 1/2	36	59	130	17.3	20
5	40	72	158	22	25
5 1/2	44	88	194	26	30
6	48	104	229	31	36
6 1/2	52	122	268	36	42
7	56	142	312	41	48
7 1/2	60	163	359	46	54
8	64	185	407	51	60
9	72	234	515	64	75
10	80	289	636	82	96
11	88	350	770	97	113
12	96	417	917	114	134
13	104	489	1076	135	158
14	112	567	1247	153	179
15	120	651	1432	173	203
16	128	741	1630	204	239
17	136	836	1839	229	267
18	144	937	2061	255	298

ISO 1346



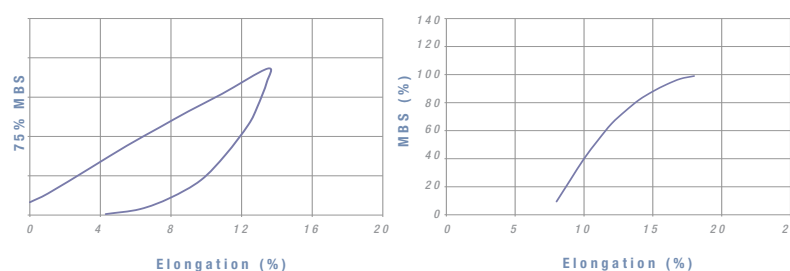
ADDITIONAL INFORMATION

COMPOSITE12 has a unique design that combines polyester with polypropylene in each yarn of its strand. 15-25% lighter than polyester ropes and 35-40% stronger than polypropylene ones.

Specific gravity	1.14 g/cm ³
UV resistance	Very high
Abrasion resistance	Very high
Elongation	Regular
Shock absorption	Regular
Splicing	Not difficult
Melting point	207°C
Color	Natural (white)
Water absorption	<1%
Floatability	Negative

WET BREAKING TEST AT 75% MBS

DRY BREAKING TEST



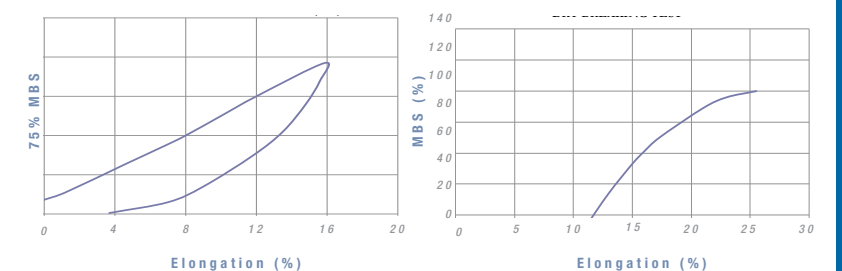
ADDITIONAL INFORMATION

A rope with positive floatability and high elongation. Its resistance, neutral water absorption and excellent handling make of it a very popular solution for general mooring needs.

Specific gravity	0.91 g/cm ³
UV resistance	High
Abrasion resistance	Regular
Elongation	Very high
Shock absorption	Regular
Splicing	Not difficult
Melting point	165°C
Color	Natural (white)
Water absorption	0%
Floatability	Positive

WET BREAKING TEST AT 75% MBS

DRY BREAKING TEST



PP12

12-STRAND POLYPROPYLENE

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	15	33	4.7	5.5
2 1/2	20	18	40	5.7	6.7
2 3/4	22	22	48	6.9	8.1
3	24	26	57	8.2	9.5
3 1/4	26	31	68	9.5	11.1
3 1/2	28	35	77	10.8	12.6
3 3/4	30	41	90	12.1	14.1
4	32	46	101	14.3	16.7
4 1/2	36	59	130	17.4	20
5	40	72	158	22	25
5 1/2	44	88	194	26	30
6	48	104	229	31	36
6 1/2	52	122	268	36	42
7	56	142	312	41	48
7 1/2	60	163	359	46	54
8	64	185	407	51	60
9	72	234	515	64	75
10	80	289	636	82	96
11	88	350	770	97	113
12	96	417	917	115	134
13	104	489	1076	136	158
14	112	567	1247	153	179
15	120	651	1432	174	203
16	128	741	1630	204	239
17	136	836	1839	229	267
18	144	937	2061	255	298

ISO 1346

POLYBLEND12 37

12-STRAND POLYOLEFIN BLEND

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	15	33	6.1	7.7
2 1/2	20	18	40	7.4	9.4
2 3/4	22	22	48	8.9	11.3
3	24	26	57	10.6	13.5
3 1/4	26	31	68	12.4	15.7
3 1/2	28	36	79	14.2	18.0
3 3/4	30	41	90	16.1	20
4	32	46	101	18.3	23
4 1/2	36	59	130	23	29
5	40	73	161	28	35
5 1/2	44	88	194	34	42
6	48	104	229	39	50
6 1/2	52	122	268	46	58
7	56	142	312	54	66
7 1/2	60	163	359	60	75
8	64	186	409	67	85
8 1/2	68	210	462	75	95
9	72	235	517	84	106
10	80	290	638	102	129
11	88	351	772	122	154
12	96	417	917	143	181
13	104	490	1078	166	209
14	112	568	1250	192	243
15	120	652	1434	218	275
16	128	742	1632	247	313
17	136	838	1844	278	352
18	144	939	2066	310	393

ISO 10572



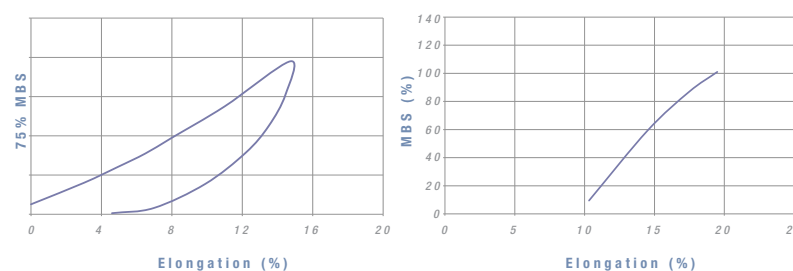
ADDITIONAL INFORMATION

Considered the successor of 8-Strand PP ropes. This firm and round construction made of a floating and resistant material brought it to be the most common solution for general mooring operations

Specific gravity	0.91 g/cm ³
UV resistance	Regular
Abrasion resistance	High
Elongation	Regular
Shock absorption	Regular
Splicing	Not difficult
Melting point	165°C
Color	Yellow
Water absorption	0%
Floatability	Positive

WET BREAKING TEST AT 75% MBS

DRY BREAKING TEST



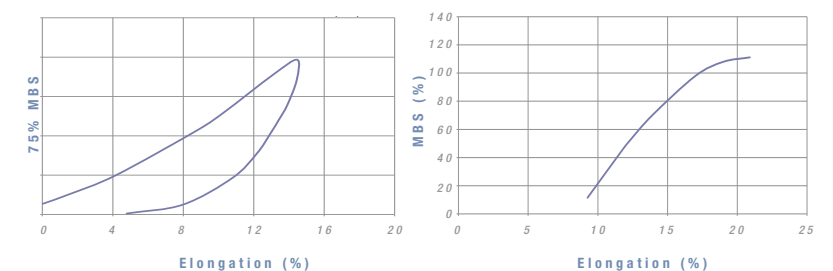
ADDITIONAL INFORMATION

Excellent grip, positive floatation and very high abrasion performance are all combined in this proprietary polyolefin blend developed by CSL. Polyblend lines are 25-35% stronger than standard PP ropes.

Specific gravity	0.93 g/cm ³
UV resistance	Regular
Abrasion resistance	Very high
Elongation	Regular
Shock absorption	Regular
Splicing	Not difficult
Melting point	165°C
Color	Orange
Water absorption	0%
Floatability	Positive

WET BREAKING TEST AT 75% MBS

DRY BREAKING TEST



POLYESTER

8-STRAND POLYESTER

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	25	55	5.3	6.5
2 1/2	20	30	66	6.4	7.8
2 3/4	22	37	81	7.8	9.5
3	24	44	97	9.2	11.2
3 1/4	26	52	114	10.6	12.9
3 1/2	28	60	132	12.0	14.7
3 3/4	30	68	150	13.5	16.4
4	32	78	172	15.3	18.7
4 1/2	36	98	216	19.4	24
5	40	121	266	24	29
5 1/2	44	147	323	29	35
6	48	175	385	34	42
6 1/2	52	205	451	41	50
7	56	238	524	46	56
7 1/2	60	273	601	51	62
8	64	311	684	57	70
9	72	393	865	73	88
10	80	486	1069	92	112
11	88	588	1294	108	132
12	96	699	1538	128	156
13	104	821	1806	153	187
14	112	952	2094	173	212
15	120	1090	2398	194	236
16	128	1240	2728	229	279
17	136	1400	3080	255	311
18	144	1570	3454	286	348

ISO 1141

NYLON

8-STRAND NYLON

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	21	46	6.8	8.3
2 1/2	20	25	55	8.2	9.9
2 3/4	22	31	68	9.8	11.9
3	24	36	79	11.5	13.9
3 1/4	26	43	95	13.4	16.3
3 1/2	28	49	108	15.3	18.7
3 3/4	30	56	123	17.4	21
4	32	64	141	21	25
4 1/2	36	81	178	26	31
5	40	100	220	31	37
5 1/2	44	121	266	37	44
6	48	144	317	44	53
6 1/2	52	170	374	51	62
7	56	197	433	57	70
7 1/2	60	226	497	64	78
8	64	257	565	73	88
9	72	325	715	92	112
10	80	401	882	114	139
11	88	486	1069	135	164
12	96	578	1272	163	199
13	104	678	1492	184	224
14	112	787	1731	217	264
15	120	903	1987	241	294
16	128	1010	2222	271	330
17	136	1160	2552	306	373
18	144	1300	2860	342	417

ISO 1340

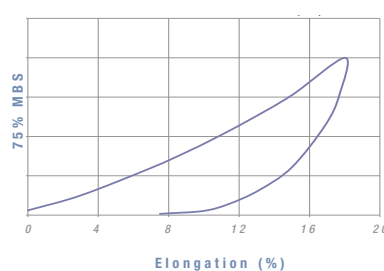


ADDITIONAL INFORMATION

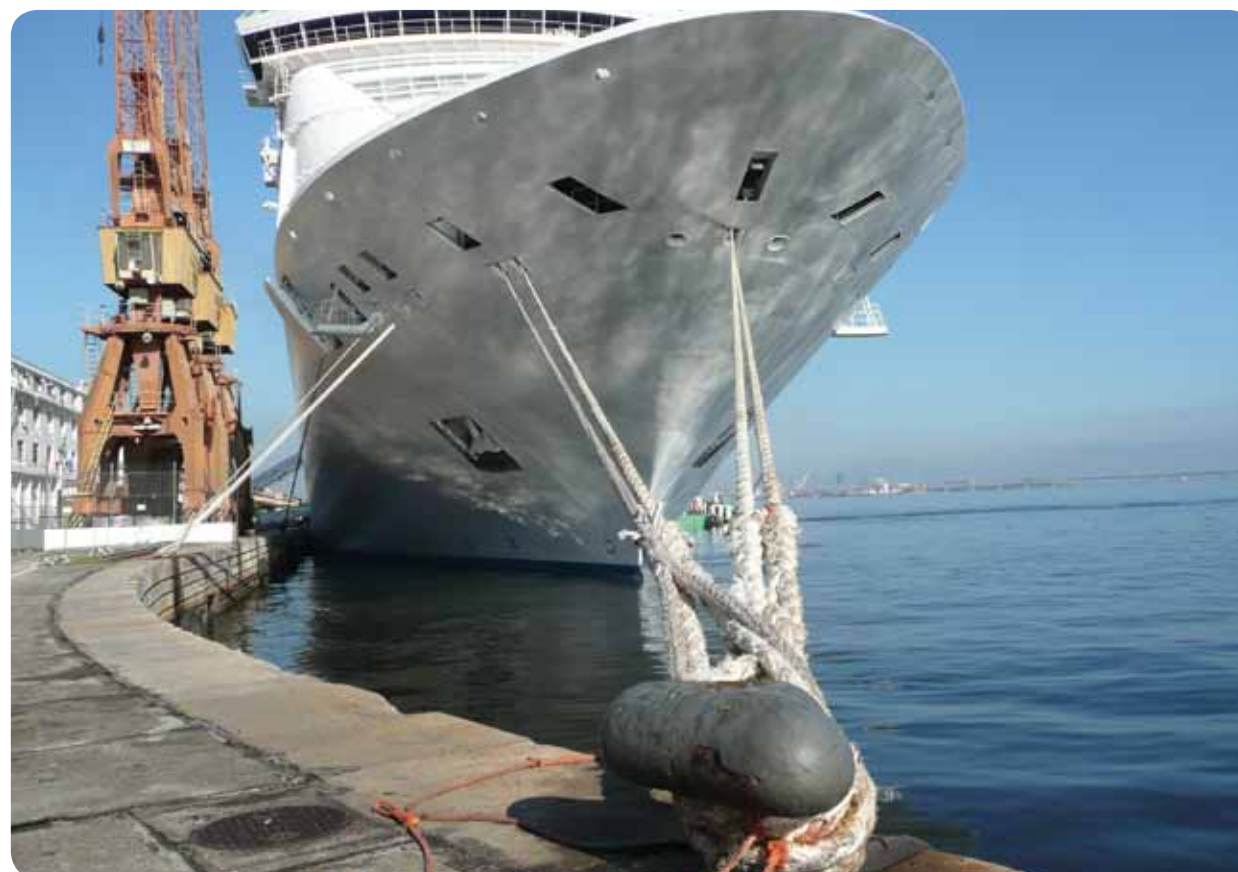
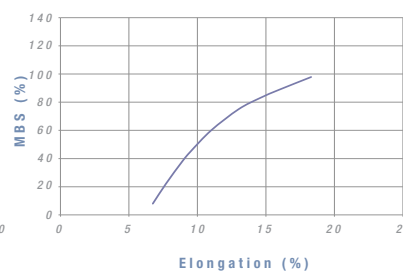
Easy to splice, strong and with great UV performance are a few features of this great mooring line. Its neutral water absorption guarantees great handling and preserves its main characteristics when wet.

Specific gravity	1.38 g/cm ³
UV resistance	Very high
Abrasion resistance	High
Elongation	Regular
Shock absorption	Low
Splicing	Simple
Melting point	265°C
Color	Natural (white)
Water absorption	<1%
Floatability	Negative

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST

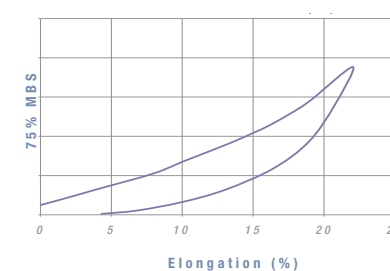


ADDITIONAL INFORMATION

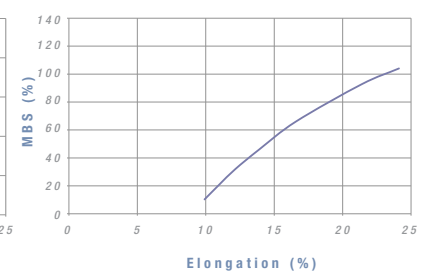
The highest shock absorption among CSL's Marine Line. An easy to splice, torque free and resistant option for your mooring operation.

Specific gravity	1.14 g/cm ³
UV resistance	High
Abrasion resistance	High
Elongation	Very high
Shock absorption	Very high
Splicing	Simple
Melting point	238°C
Color	Natural (white)
Water absorption	<9%
Floatability	Negative

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST



COMPOSITE8

8-STRAND PP/PES

MFP8

41

JJCSL

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	18	39	6.4	7.7
2 1/2	20	22	49	7.8	9.5
2 3/4	22	27	59	9.3	11.3
3	24	32	70	10.9	13.3
3 1/4	26	37	82	12.8	15.5
3 1/2	28	43	95	14.7	17.9
3 3/4	30	50	110	16.7	21
4	32	57	125	19.0	23
4 1/2	36	72	158	24	29
5	40	89	195	29	36
5 1/2	44	107	235	35	43
6	48	127	279	41	50
6 1/2	52	150	330	48	59
7	56	173	381	56	68
7 1/2	60	199	438	63	77
8	64	227	499	72	87
9	72	287	631	90	109
10	80	354	779	109	133
11	88	428	942	132	161
12	96	510	1122	155	189
13	104	600	1320	181	220
14	112	690	1518	208	254
15	120	796	1751	238	290
16	128	906	1993	268	327
17	136	1020	2244	302	368
18	144	1150	2530	337	411

ISO 10556

8-STRAND MULTIFILAMENT POLYPROPYLENE

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	15	33	4.4	5.2
2 1/2	20	18	40	5.4	6.3
2 3/4	22	22	48	6.5	7.6
3	24	26	57	7.7	8.9
3 1/4	26	31	68	9.0	10.4
3 1/2	28	35	77	10.2	11.9
3 3/4	30	41	90	11.4	13.4
4	32	46	101	13.5	15.7
4 1/2	36	59	130	16.3	19.1
5	40	72	158	21	24
5 1/2	44	88	194	24	28
6	48	104	229	29	34
6 1/2	52	122	268	34	40
7	56	142	312	38	45
7 1/2	60	163	359	44	51
8	64	185	407	50	58
9	72	234	515	61	72
10	80	289	636	77	90
11	88	350	770	92	107
12	96	417	917	108	127
13	104	489	1076	128	149
14	112	567	1247	143	167
15	120	651	1432	163	191
16	128	741	1630	194	227
17	136	836	1839	216	253
18	144	937	2061	241	282

ISO 1346



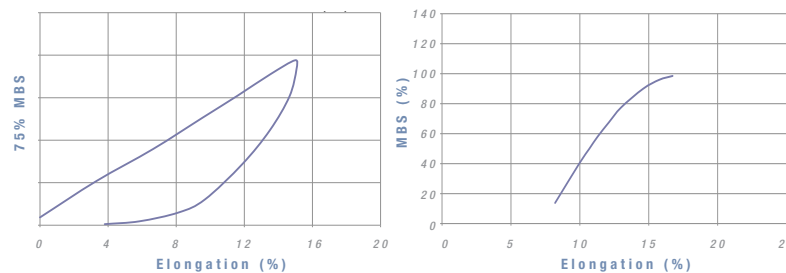
ADDITIONAL INFORMATION

Combining polyester and polypropylene in each of its yarns, this rope can be 15-25% lighter than 100% polyester and 35-40% stronger than polypropylene ones. This is the easiest to splice option of the composite series.

- Specific gravity: 1.14 g/cm³
- UV resistance: Very high
- Abrasion resistance: Very high
- Elongation: Regular
- Shock absorption: Regular
- Splicing: Simple
- Melting point: 207°C
- Color: Natural (white)
- Water absorption: <1%
- Floatability: Negative

WET BREAKING TEST AT 75% MBS

DRY BREAKING TEST



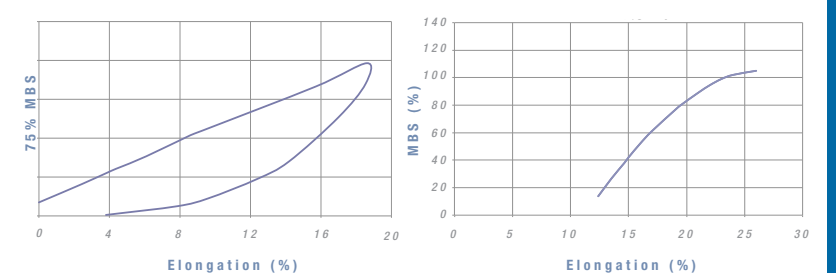
ADDITIONAL INFORMATION

A stretching and easy to splice PP multifilament rope. Great choice where smooth handling is necessary.

- Specific gravity: 0.91 g/cm³
- UV resistance: Regular
- Abrasion resistance: High
- Elongation: Very high
- Shock absorption: Regular
- Splicing: Simple
- Melting point: 165°C
- Color: Natural (white)
- Water absorption: 0%
- Floatability: Positive

WET BREAKING TEST AT 75% MBS

DRY BREAKING TEST





8-STRAND POLYPROPYLENE

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	15	33	4.4	5.2
2 1/2	20	18	40	5.4	6.3
2 3/4	22	22	48	6.5	7.6
3	24	26	57	7.7	8.9
3 1/4	26	31	68	8.9	10.4
3 1/2	28	35	77	10.2	11.9
3 3/4	30	41	90	11.4	13.4
4	32	46	101	13.5	15.7
4 1/2	36	59	130	16.3	19.1
5	40	72	158	21	24
5 1/2	44	88	194	24	28
6	48	104	229	29	34
6 1/2	52	122	268	34	40
7	56	142	312	38	45
7 1/2	60	163	359	44	51
8	64	185	407	50	58
9	72	234	515	61	72
10	80	289	636	77	90
11	88	350	770	92	107
12	96	417	917	108	127
13	104	489	1076	128	149
14	112	567	1247	143	167
15	120	651	1432	163	191
16	128	741	1630	194	227
17	136	836	1839	216	253
18	144	937	2061	241	282

ISO 1346



8-STRAND POLYOLEFIN BLEND

Circumference at load	Nominal diameter	Nominal mass at load	Nominal mass at load	Minimum breaking strength	Average breaking strength
inches	mm	kg/100m	kg/220m	tons	tons
2 1/4	18	15	33	6.1	7.4
2 1/2	20	18	40	7.4	9.1
2 3/4	22	22	48	8.9	10.9
3	24	26	57	10.6	12.9
3 1/4	26	31	68	12.3	15.0
3 1/2	28	36	79	14.2	17.3
3 3/4	30	41	90	16.1	19.6
4	32	46	101	18.3	22
4 1/2	36	59	130	23	28
5	40	73	161	28	34
5 1/2	44	88	194	34	41
6	48	104	229	39	48
6 1/2	52	122	268	46	56
7	56	142	312	53	64
7 1/2	60	163	359	60	73
8	64	186	409	67	82
8 1/2	68	210	462	75	92
9	72	235	517	84	102
10	80	290	638	102	124
11	88	351	772	122	148
12	96	417	917	143	174
13	104	490	1078	165	202
14	112	568	1250	192	234
15	120	652	1434	217	265
16	128	742	1632	247	301
17	136	838	1844	278	338
18	144	939	2066	310	378

ISO 10572

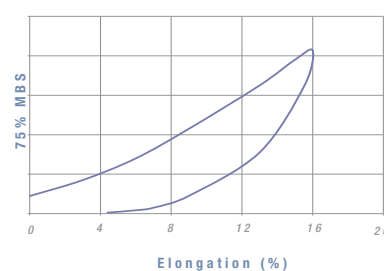


ADDITIONAL INFORMATION

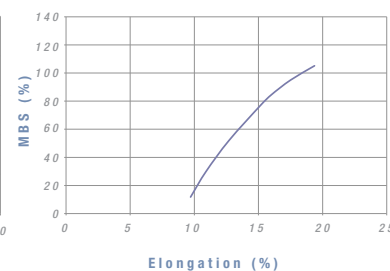
A mooring line that combines floatability and ease to splice into an economically efficient solution.

Specific gravity	0.91 g/cm ³
UV resistance	Regular
Abrasion resistance	High
Elongation	Regular
Shock absorption	Regular
Splicing	Simple
Melting point	165°C
Color	Yellow
Water absorption	0%
Floatability	Positive

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST

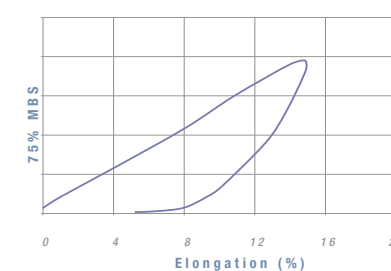


ADDITIONAL INFORMATION

Made of CSL's proprietary polyolefin blend, these ropes are 25-35% stronger than standard polypropylene ropes and with very similar characteristics.

Specific gravity	0.93 g/cm ³
UV resistance	Regular
Abrasion resistance	Very high
Elongation	Regular
Shock absorption	Regular
Splicing	Simple
Melting point	165°C
Color	Orange
Water absorption	0%
Floatability	Positive

WET BREAKING TEST AT 75% MBS



DRY BREAKING TEST

