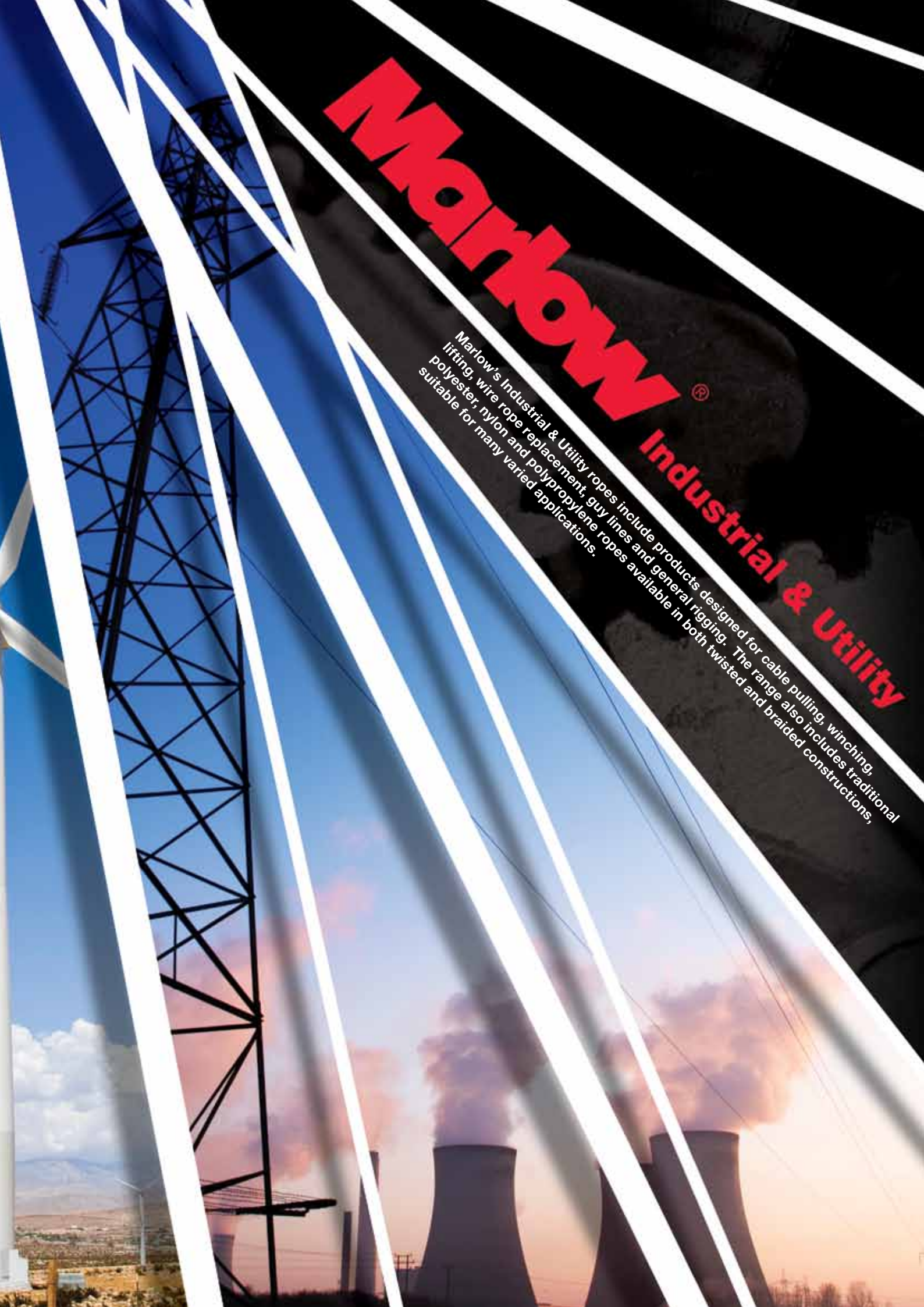


Marlow®

Industrial & Utility

Marlow's Industrial & Utility ropes include products designed for cable pulling, winching, lifting, wire rope replacement, guy lines and general rigging. The range also includes traditional polyester, nylon and polypropylene ropes available in both twisted and braided constructions, suitable for many varied applications.

Technical Ropes

All ropes offer different characteristics such as varying stretch, strength, heat resistance and weight which will depend on specific project and application requirements. The Marlow team is available to assist you with your choice of rope.

Many of our products can be manufactured for specific project requirements to required length with factory finished terminations and with specialist fittings.

D12

Construction	12 Strand Dyneema® with PU Coating
Colours	Black, Green, Blue, White
Lengths	200m, (longer lengths available to order)
Benefits	High strength Dyneema®, Low stretch, Excellent flex fatigue, Light weight, ArmourCoat UV and abrasion coating

Diameter (mm)	2.5	3	4	5	6	8
Min Break Load (kN)	4.81	8.38	14.91	18.68	26.28	48.36
Weight (g/m)	4.1	6.0	12.4	14.7	19.3	24.0

Diameter (mm)	9	10	12	14	16
Min Break Load (kN)	60.36	83.67	104.59	134.61	145.94
Weight (g/m)	37.6	48.3	58.2	76.0	98.0

D12 Plus

For larger winches and high load applications Marlow also manufacture a full range of 12 strand Dyneema® SK75 products up to 40mm diameter and 1255 kN (128 tonnes) break load.

Where even higher break loads for a given diameter are required, D12 Plus is also available in Dyneema® SK90. For applications where flex fatigue is a critical factor, such as two drum traction winches, D12 Plus is available in Dyneema® XB0, a treatment applied at yarn manufacturing stage which increases resistance to bending fatigue.

For detailed specifications or to discuss specific project requirements, please contact our technical department. T: +44(0) 1323 444444 @: technical@marlowropes.com

Construction	12 Strand Dyneema® SK75, SK90 or XB0, Marlow ArmourCoat

Diameter (mm)	16	18	20	22	24	28
Min Break Load* (kN)	234.38	310.87	389.32	461.89	490.33	665.87
Weight (g/m)	123	165	210	252	270	375

Diameter (mm)	30	32	36	40
Min Break Load* (kN)	769.86	869.85	1059.12	1255.25
Weight (g/m)	438	501	625	750

* figures for SK75 construction

V12

Construction	12 Strand Vectran® with PU coating
Colours	Black, Natural
Lengths	200m, (longer lengths available to order)
Benefits	High strength Vectran®, Very low stretch No creep, ArmourCoat UV and abrasion coating, Heat resistant

Diameter (mm)	2.5	3	4	5	6	8
Min Break Load (kN)	5.65	8.95	15.13	21.69	30.22	51.88
Weight (g/m)	5.9	8.6	17.8	21.2	27.8	33.8

Diameter (mm)	9	10	12	14	16
Min Break Load (kN)	78.31	99.06	107.82	132.63	166.2
Weight (g/m)	52.8	68.0	86.4	107.0	142.0

Excel Racing

Construction:	8 Strand Dyneema core with high tenacity polyester cover
Colours:	Red, Blue, Black, Lime, Purple, White with coloured flecks
Lengths:	100m, 200m
Benefits:	High strength Dyneema® core, Low stretch, Light weight, Excellent flex fatigue

Diameter (mm)	1.5	2	3	4	5	6
Min Break Load (kN)	1.06	1.36	2.03	4.91	8.24	16.70
Weight (g/m)	1.5	3.4	6	10	19	25

KT3

Construction:	3 Strand Aramid Core with high tenacity polyester cover
Colours:	White with orange fleck (black available with minimum order)
Lengths:	100m, 200m
Benefits:	High strength Aramid core Low stretch Heat resistant core

Diameter (mm)	3.5	4.5	5.5	6	8	10
Min Break Load (kN)	4.32	5.59	7.46	11.87	25.31	36
Weight (g/m)	11	13	21	31	53	78

Diameter (mm)	12	14
Min Break Load (kN)	54.25	79.76
Weight (g/m)	116	135

Marlowbraid

Construction:	3 Strand Polyester core with 16 plait polyester cover
Colours:	White with coloured flecks, or solid red, white, blue, navy, green & black
Lengths:	100m, 200m
Benefits:	Lower stretch than standard polyester ropes Higher strength Hard wearing

Diameter (mm)	6	8	10	12	14	16
Min Break Load (kN)	8.93	15.21	26.68	35.90	49.64	65.24
Weight (g/m)	30	45	73	100	145	190

Diameter (mm)	18	20
Min Break Load (kN)	75.34	84.86
Weight (g/m)	235	285

D2

Construction: 12 Strand Dyneema core with high tenacity polyester cover
Colours: White, Blue, Green, Red, Lime, Black, Natural, Grey, Navy
Lengths: 100m, 200m

Benefits: High strength Dyneema® core
Low stretch, Light weight
Excellent flex fatigue

Diameter (mm)	8	10	12	14	16	18
Min Break Load (kN)	35.65	48.37	60.38	83.70	104.62	134.64
Weight (g/m)	44	59	94	106	140	199

Diameter (mm)	20	24
Min Break Load (kN)	145.94	211.86
Weight (g/m)	245	353

Singlebraid Aramid

Construction: 8 Plait or 16 Plait Aramid
Colours: Yellow
Lengths: Made to order

Benefits: High strength Aramid
Very low stretch, Heat resistant
Manufactured to BS F 143

Diameter (mm)	2	3	4	5	7	10
Min Break Load (kN)	3.43	7.06	10.30	11.77	34.34	55.92
Weight (g/m)	3.4	6.3	9.5	12.5	37.0	60.0

Diameter (mm)	13
Min Break Load (kN)	10.79
Weight (g/m)	118.0

Specialist Cabling Products

Superline

Construction: Multiple 3-strand polyester cores, 16 plait polyester cover
Colours: White
Lengths: Made to Order
Applications: Cabling and winching

Benefits: High strength
Low stretch, Abrasion resistant

Diameter (mm)	16	18	20	22	24	28
Min Break Load (kN)	79.46	113.80	126.55	148.31	181.49	220.73
Weight (g/m)	180	280	320	360	450	550

Diameter (mm)	32	36
Min Break Load (kN)	299.21	357.08
Weight (g/m)	770	870

Dyneema Superline

Construction: Multiple 3-Strand Dyneema® cores, 16 plait polyester cover
Colours: White
Lengths: Made to Order
Applications: Cabling and winching

Benefits: Very high strength
Very low stretch
Abrasion resistant

Diameter (mm)	28	32	36
Min Break Load (kN)	608.22	716.13	912.33
Weight (g/m)	458	671	774

Paraline

Construction: Twisted polyester core, 16 plait polyester cover
Colours: White, Red, Blue
Lengths: Lengths made to Order
Applications: Cabling

Benefits: Extremely stiff
Very low twist
High strength

Diameter (mm)	6	8	10	12
Min Break Load (kN)	17.56	29.43	43.16	56.80
Weight (g/m)	41	66	87	126

Rope Cabling 4 (RC4)

Construction: 3 Strand Aramid Core with high tenacity polyester cover
Colours: Yellow
Lengths: 100m, 200m
Applications: Cabling

Benefits: High strength
Very low stretch
Heat resistant core
Protective PU coating

Diameter (mm)	13
Min Break Load (kN)	58.80
Weight (g/m)	135

Standard & General Purpose Ropes

3-Strand Polyester

Construction: 3 strand polyester
Colours: White w/ black fleck, Black, Navy Blue
Lengths: 100m, 200m, 220m (plain white only)

Benefits:
- No strength loss when wet
- Soft and flexible, Very easily spliced
- Good abrasion resistance
- Manufactured to BS EN ISO1141

Diameter (mm)	4	6	8	10	12	14
Min Break Load (kN)	2.94	5.49	10.01	15.60	22.27	31.20
Weight (g/m)	12	27	48	76	110	148

Diameter (mm)	16	18	20	24	28	32
Min Break Load (kN)	39.83	49.83	62.29	89.57	119.98	154.02
Weight (g/m)	195	245	303	437	594	778

3-Strand Nylon

Construction: 3 strand nylon
Colours: Plain White
Lengths: 100m, 200m, 220m

Benefits:
- Strong compared to 3 strand polyester
- High elongation, Very easily spliced
- Manufactured to BS EN ISO1140

Diameter (mm)	6	8	10	12	14	16
Min Break Load (kN)	7.36	13.24	20.40	29.43	40.22	51.99
Weight (g/m)	23	40	62	89	122	158

Diameter (mm)	18	20	24	28	32
Min Break Load (kN)	65.73	81.42	118.01	155	196
Weight (g/m)	200	245	355	485	630

3-Strand Pre Stretched

Construction: 3 strand polyester, pre-stretched
Colours: White with markers
Lengths: 100m, 200m, longer lengths to order

Benefits:
- Stronger than standard 3-strand polyester
- Low stretch
- Very easily spliced
- Manufactured to BS EN ISO1140

Diameter (mm)	3	4	5	6	7	8
Min Break Load (kN)	2.84	5.20	6.18	9.22	12.16	15.40
Weight (g/m)	10	16	21	31	41	48

Diameter (mm)	9	10	12	14
Min Break Load (kN)	19.42	23.54	29.82	44.05
Weight (g/m)	66	82	107	148

3-Strand Nelson

Construction: 3 Strand staple spun polypropylene
Colours: White
Lengths: 100m, 200m, 220m

Benefits:
- Light weight, Floats
- Excellent grip
- Very easily spliced

Diameter (mm)	6	8	10	12	14	16
Min Break Load (kN)	5.89	10.40	15.30	21.68	29.92	36.98
Weight (g/m)	17	30	45	65	90	115

Diameter (mm)	18	20	24	28	32
Min Break Load (kN)	47.19	56.90	79.66	104.97	132.04
Weight (g/m)	148	180	260	355	460

Hardy Hemp

Construction: 3 Strand Polypropylene
Colours: Natural
Lengths: 100m, 200m

Benefits:
- Floats, Very easily spliced
- Natural fibre effect without rotting

Diameter (mm)	6	8	10	12	14	16
Min Break Load (kN)	2.94	4.90	9.32	13.34	18.73	24.52
Weight (g/m)	15	28	45	62	81	117

Diameter (mm)	18	20	22	24
Min Break Load (kN)	31.09	41.38	44.23	48.35
Weight (g/m)	140	194	232	263

Multiplait Nylon

Construction: 8 Strand Nylon
Colours: White
Lengths: 100m, 200m, 220m

Benefits:
- Elasticity & flexibility
- Absorbs high shock loads
- Easily spliced
- Non-kinking
- Manufactured to BS EN ISO1140

Diameter (mm)	8	10	12	14	16	18
Min Break Load (kN)	13.98	20.40	29.43	40.22	51.99	65.73
Weight (g/m)	42	62	89	122	158	200

Diameter (mm)	20	24	28	32
Min Break Load (kN)	81.42	118.01	155	196
Weight (g/m)	245	355	485	630

Standard & General Purpose Ropes

Doublebraid

Construction: 12 Strand Polyester core with 24 plait polyester cover
Colours: White and white with coloured flecks (Red, Blue, Green, Yellow, plain White)
Lengths: 100m, 200m

Benefits:
Strength
Soft & Flexible
Easily Spliced

Diameter (mm)	6	8	10	12	14	16
Min Break Load (kN)	11.92	17.22	27.55	37.96	49.27	53.95
Weight (g/m)	28	52	81	116	153	216

Diameter (mm)	18	20
Min Break Load (kN)	62.69	79.11
Weight (g/m)	260	348

Mattbraid

Construction: 24 Plait Spun Polyester Cover / Braided Polyester Core
Colours: White, Blue, Red, Black
Lengths: 100m, 200m

Benefits:
Soft matt cover for comfort and grip
Flexible

Diameter (mm)	4	5	6	8	10	12
Min Break Load (kN)	2.35	3.04	4.61	9.89	17.48	24.81
Weight (g/m)	13	20	25	50	70	99

Diameter (mm)	14	16	18	20
Min Break Load (kN)	29.14	47.94	72.20	79.46
Weight (g/m)	126	178	244	298

Excel Pro

Construction: Twisted polyester core, 16 plait polyester cover
Colours: Red, Blue, Purple, Black, Lime with markers
Lengths: 100m, 200m

Benefits:
Low stretch
Smooth running cover
Distinctive colours for easy identification

Diameter (mm)	2	3	4	5	6
Min Break Load (kN)	0.81	1.67	2.79	6.05	8.09
Weight (g/m)	2.8	6.5	9	20	30

8 Plait Pre-Stretched

Construction: Twisted polyester core, 8 plait polyester cover
Colours: White, Black, Red, Blue, Lime
Lengths: 100m, 200m

Benefits:
Strong
Low stretch
Good abrasion resistance

Diameter (mm)	4	5	6	7*	8
Min Break Load (kN)	3.24	5.20	6.87	7.65	12.07
Weight (g/m)	13	21	29	43	55

* minimum order quantities apply

8 Plait Standard

Construction: 8 plait polyester
Colours: Solid White, Black, Olive Drab
Lengths: 100m, 200m

Benefits:
Good general purpose cord

Diameter (mm)	1	1.5	2	3	4
Min Break Load (kN)	0.34	0.70	1.01	1.63	1.96
Weight (g/m)	1.8	2.3	3.2	7.4	10.5

Polyester "SYC" Cord

Construction: Twisted polyester core, 8 plait polyester cover
Colours: Solid White, Olive Drab (to Order)
Lengths: 100m, 200m, 220m

Benefits:
Good general purpose cord
Manufactured to BS 4136

Diameter (mm)	2.75	4	5	7	9
Reference	SYC32	SYC33	SYC11	SYC30	SYC31
Min Break Load (kN)	160	227	295	625	794
Weight (g/m)	7.5	11.4	18	34	54

8 Plait Marstron

Construction: Twisted polypropylene core, 8 plait polypropylene cover
Colours: Orange, Yellow
Lengths: 100m & 200m

Benefits:
Light weight
Floats
Used as rescue lines

Diameter (mm)	6	8	10
Min Break Load (kN)	400	610	1130
Weight (g/m)	17.6	27	50

Rope Terminations and Assemblies

Our experienced Technical Team are able to help specify and design ropes and rope assemblies for specific projects and applications.
Please contact technical@marlowropes.com or call +44 (0)1323 444444 for more information.

A wide variety of factory finished rope terminations are available to suit strength and usage requirements.

Splices

Most Marlow ropes can be spliced, this is normally the preferred method of termination. A good splice using the recommended method should not reduce the strength of a rope by more than 10%.

Knots

A knot will reduce the strength of the rope, sometimes very significantly. This loss is caused by the tight bends and compression found in any knot. The amount a rope will be weakened will depend on the knot, type of rope and the material from which it is made but can be up to 60%

Sewn

Some ropes cannot be spliced and in these situations a sewn termination offers a considerably stronger option than a simple knot. However, for all ropes a sewn termination offers the consistency of a computer controlled process and easy inspection. However, a sewn termination will not normally be as strong as a good splice.

Eye Sizes

Wherever possible the angle formed at the throat of a splice or sewn termination when it is loaded should be 30 degrees or less. This means that the length of the eye when flat must be at least 2.7 times the diameter of the object over which the eye is to be used and the distance from the bearing point to the throat when in use should be at least 2.4 times the diameter.

Some materials like Aramids and HMPEs will require a larger eye with an angle at the throat of 15 degrees or less.

The images below represent a small selection of the 100's of different terminations and finishes available.

Technical Information

Physical Properties

Specific gravity (buoyancy of a rope / material)

Specific gravity is a measure of the density of a material; a Specific Gravity of 1.0 is equivalent to a density of 1g per cm3 (i.e. a Specific Gravity <1 means the material floats). The following table shows the specific gravity of some of the materials commonly used in fibre ropes.

Material	Specific Gravity
Polypropylene	0.91
HMPE (Dyneema®)	0.98
Fresh Water	1.0
Sea Water	1.03
Nylon	1.14
Polyester	1.38
Vectran®	1.41
Aramids (Technora®, Nomex®, Kevlar®, Twaron®)	1.44
Zylon®	1.54
Steel	7.85

Ultra Violet Radiation Resistance

All materials are affected by UV radiation to some extent. The following table attempts simply to rank different materials in line with their resistance to UV radiation

Material	UV Ranking
Polyester	5
HMPE (Dyneema®)	5
Nylon (UV treated)	4
Aramids (Technora®, Nomex®, Kevlar®, Twaron®)	3
Vectran®	3
Polypropylene	2
Zylon®	1

Melting point

The table below shows the typical melting or decomposition temperature of some common rope making materials.

Material	Melting Point (Degrees C)
Zylon®	650 (decomposition)
Aramids (Technora®, Nomex®, Kevlar®, Twaron®)	500 (decomposition)
Vectran®	330
Polyester	260
Nylon 6.6	250
Nylon 6	220
Polypropylene	170
HMPE (Dyneema®)	150

Chemical Resistance / This table shows the residual strengths of synthetic fibres after chemical exposure under specific conditions

	Test Conditions			Residual Strength Type of Fibre				
Chemical	Concentration Chemical to Water	Temperature	Exposure Hours	Nylon	Polyeste r	Polypropylene	Aramid	Dyneema®
Acids								
Hydrochloric	34%	20°C	100	0%	90%	100%	95%	100%
Nitric	66%	20°C	100	0%	70%	100%	95%	95%
Sulphuric	96%	20°C	100	0%	100%	100%	40%	90%
Formic	90%	20°C	100	0%	95%	100%	90%	100%
Acetic	100%	20°C	100	85%	95%	100%	100%	100%
Alkalis								
Caustic Soda	40%	20°C	100	50%	0%	90%	90%	100%
Caustic Soda	20%	70°C	150	100%	0%	100%	85%	90%
Caustic Potash	40%	20°C	100	90%	0%	90%	90%	100%
Solvents								
Trichloroethylene	100%	30°C	150	100%	95%	80%	100%	100%
Carbon Tetrachloride	100%	20°C	150	100%	100%	100%	98%	100%
Benzene	100%	70°C	150	100%	100%	100%	98%	95%
Metacresol	100%	100°C	4	0%	0%	100%	80%	100%
Oxidising Agents								
Hydrogen peroxide	10%	20°C	100	0%	100%	90%	95%	100%

Rope Strengths and Weights

Rope strengths are tested according to Marlow's QA25 and 26 quality procedures. Generally these procedures are in line with BS EN ISO 2307, however, a number of other internationally recognised test standards are used including EN 1891, EN 892 and EN 564.

Rope mass is determined be weighing a sample of rope whose length has been measured at a reference load. For most ropes this load is calculated as:

Reference Load (kg) = D2/8

Where D is the rope nominal diameter (mm)

Working Loads: Marlow Ropes specify a minimum breaking load (or sometimes an Average Breaking Load). It is the responsibility of the user to determine an appropriate factor of safety and safe working load. This factor of safety must be determined after considering all the risks, the strength reducing factors, and the expected life of the rope. For factors that may affect the strength or expected life of a rope and therefore the determination of the safe working load, please contact our technical department: technical@marlowropes.com or +44 (0) 1323 444444.

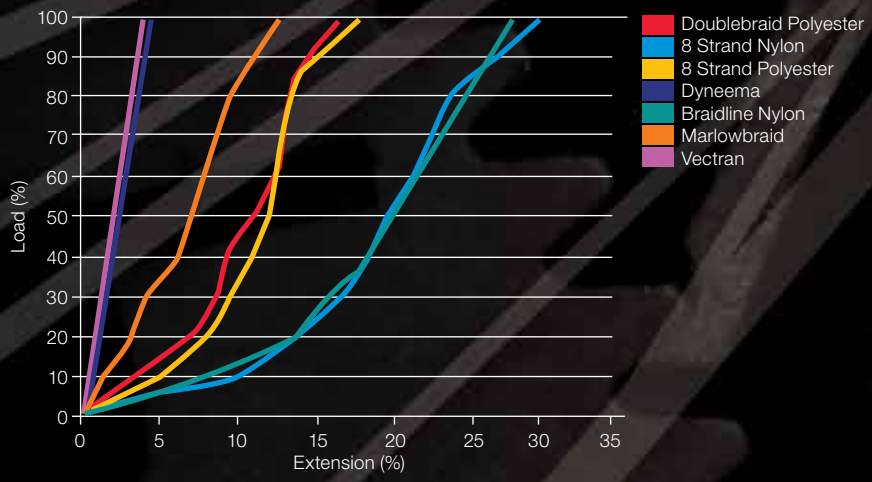
Rope strengths in this catalogue are given in Kilonewtons (kN).which is the correct measure of force or breaking strength. However most people are more familiar with kilograms (kg) so below are conversion factors from one to the other:

kN to kg	x 101.972
Kg to kN	x 0.00981

Technical Information

Load Extension

The graph below shows the relative elongation of different products and materials when put under load



Care In Use

Storage

Ropes should be stored in a suitable clean, dry place out of direct sunlight and away from extreme temperature. Do not store ropes on dirty floors or drag over rough ground – dirt and grit can work between the fibres and cause abrasion damage. Keep ropes away from chemicals and in cases of long term storage, hose down with fresh water to reduce dirt and salt that can affect the life and efficiency.

Coil ing

3 Strand ropes may become damaged if they are taken from a coil the wrong way. If this happens turn the coil over and withdraw the rope from the centre – the rope should run correctly without kinking

Braided ropes can have excessive twist imparted into them by incorrect handling. Ideally these ropes should be "hanked" in a figure of 8 fashion which avoids putting twist in and will ensure free running when deployed.

If supplied on a reel, this must be allowed to rotate freely on a central pin so that the rope may be drawn off from the top layer. Never take the rope from a reel lying on its side unless placed onto a turntable.

Sheaves, pulleys and rollers

When any rope is used around a sheave there will be a reduction in its strength and life. For most non-specialised applications a sheave diameter 8-10 times the rope diameter will suffice, however certain materials such as Aramids may require a sheave size of up to 20 times diameter

The profile of the groove in a sheave should support the entire rope. Normally a semicircle of 10% greater diameter than that of the rope is appropriate. 'V' groove sheaves should be avoided since they compress the rope and have points of local friction reducing the life of the rope. Sheaves should be maintained so that they rotate freely in use.

Winches and capstans

When a rope is wound onto a winch it is important that the wraps are neat and tightly wound. This can be achieved by winding the rope on whilst under tension. If the rope is wound on slack then it will be more prone to burying between the turns of the previous layer.

Length of rope that can be held on a winch drum or reel can be calculated as follows:

$$\text{Length (m)} = \frac{710542 \times T(F2-D2)}{d2}$$

Where:
T= Traverse in metres
F= Flange diameter in metres
D= Drum diameter in metres
d= Rope diameter in millimetres

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