COTESI®

MARINE DIVISION

COTESI in the world

COTESI

Cotesi - Companhia de Têxteis Sintéticos, S.A. was born in 1967 as the forerunner in Europe in the production of twine, sisal, nets and ropes made from synthetic and natural raw materials and is, today, one of the world's largest producers. Its roots, however, date back all the way to 1943 with the creation of Grupo Violas by Commander Manuel de Oliveira Violas – initially, a ropework and textiles company which has, from then on, evolved and diversified to various business areas becoming one of Portugal's biggest companies.
With a global presence, Cotesi is the premier world player in distribution and supply channels, with strong units in Europe, North America and South America. A pioneer in its field, Cotesi's proactive technical innovation and constant R&D define the company's success.

COTESI MARINE DIVISION

Cotesi Marine Division was born as a provider of solutions to the increasing needs faced by our maritime customers. Our vast experience in R&D comes from our close contact with customers with which we work together in order to provide the latest solutions in the market. Their trust and willingness to improve alongside us has led us to achieve a leadership position in innovation.
Our portfolio comprises a vast collection of ropes - from Mooring to Towing, Anchor to Winch Lines - and for all strengths and needs - double braids to jacket, from 12 strands to 3. And if the solution is not here, then we will find it together with you. Go Forward With Cotesi!

COTESI
CONTACTS

Industrial

Sisal Ropes

Traditional ropes made from a blend of selected natural fibers, with good abrasion resistance and low elongation. These are biodegradable and non-polluting, as well as excellent for classic old fashion ships. A special colour treatment can be applied upon request to match the natural colour of the manila fiber.

3 / 4 Strands

Advantages

- Low elongation
- Bio degradable, non-polluting
- Does not slip
- Good UV resistance

Applications

Classic Vessels

Tie-up Lines

Diameter		Size Circ.	Weight			Breaking Load		
mm	Inches	Inches	Ktex	Kg/ 100m	lbs/ 100ft	kgf	lbf	kN
6	1/4	3/4	25	2,5	1,7	263	580	3
8	5/16	1	44	4,4	3	459	1.012	4
10	3/8	1 1/4	69	6,9	4,7	707	1.558	7
12	1/2	1 1/2	99	10	6,7	1.005	2.217	10
14	9/16	1 3/4	136	13,6	9,1	1.356	2.990	13
16	5/8	2	177	17,7	11,9	1.754	3.867	17
18	3/4	2 1/4	225	22,5	15,1	2.203	4.856	22
20	13/16	2 1/2	277	27,7	18,6	2.702	5.957	26
22	7/8	2 3/4	335	33,5	22,5	3.253	7.171	32
24	1	3	399	39,9	26,8	3.855	8.498	38
26	1 1/32	3 1/4	468	46,8	31,4	4.507	9.936	44
28	1 1/8	3 1/2	543	54,3	36,5	5.201	11.465	51
30	1 1/4	3 3/4	624	62,4	41,9	5.945	13.106	58
32	1 5/16	4	710	71	47,7	6.730	14.837	66
34	1 11/32	4 1/4	804	80,4	54	7.546	16.636	74
36	1 1/2	4 1/2	898	89,8	60,3	8.453	18.636	83
38	1 9/16	4 3/4	1.004	100,4	67,5	9.381	20.682	92
40	1 5/8	5	1.110	111	74,6	10.401	22.930	102
44	1 3/4	5 1/2	1.340	134	90	12.441	27.426	122

More diameters available by demand.

In accordance to ISO 1181:2004.

- Raw Material: Sisal
- Specific Gravity: 1,38
- Elongation at % of BS:
  25% 4%
  50% 7%

Sisal Packing Twine

With a production unit in Portugal, Cotesi offers a complete range of Sisal Packing Twine solutions. Customized to your needs and presented in different shapes and sizes.

Packing Twine

Applications

Commerce

General Usage

Ref.	Runnage			Breaking Load		
	m/kg	ft/lb	tol.	kgf	lbf	kN
200/1	200	300		77	170	0,8
300/1	300	450		51	112	0,5
400/1	400	600		41	90	0,4
500/1	500	750		32	71	0,3
600/1	600	900		27	60	0,3
200/2	98	147		166	366	1,6
300/2	147	220		110	243	1,1
400/2	196	294		89	196	0,9
500/2	245	367		70	154	0,7
600/2	294	440		58	128	0,6
200/3	65	97	+/- 8%	250	551	2,5
300/3	98	147		166	366	1,6
400/3	131	166		134	295	1,3
500/3	163	244		107	236	1
600/3	196	294		89	196	0,9
200/4	49	73		335	739	3,3
300/4	73	109		223	492	2,2
400/4	98	147		179	395	1,8
500/4	122	183		143	315	1,4
600/4	147	220		119	262	1,2

Available in 1, 2, 3 and 4 ply in a shape of balls or spools.
Standard colour is Natural.

PP Film

A PP film twisted rope that has a high level of strength and excellent service life compared to other standard polypropylene twisted ropes.

3 / 4 Strands

Advantages

- Direct and twisted yarn construction
- Lightweight
- Good wear resistance

Applications

General usage

Tie-up Lines

Diameter		Size Circ.	Weight			Breaking Load		
mm	Inches	Inches	Ktex	Kg/ 100m	lbs/ 100ft	kgf	lbf	kN
4	5/32	3	7	0,7	0,5	283	625	3
5	3/16	3 1/4	11	1,1	0,8	431	951	4
6	1/4	3 1/2	16	1,6	1,1	604	1.331	6
8	5/16	3 3/4	29	2,9	1,9	1.030	2.271	10
10	3/8	4	45	4,5	3	1.570	3.462	15
12	1/2	4 1/2	65	6,5	4,4	2.203	4.856	22
14	9/16	5	89	8,9	6	2.947	6.497	29
16	5/8	5 1/2	116	11,6	7,8	3.773	8.318	37
18	3/4	6	146	14,6	9,8	4.711	10.386	46
20	13/16	3	181	18,1	12,2	5.721	12.612	56
22	7/8	3 1/4	219	21,9	14,7	6.842	15.084	67
24	1	3	260	26	17,5	8.035	17.715	79
26	1 1/32	3 1/4	306	30,6	20,6	9.330	20.570	91
28	1 1/8	3 1/2	354	35,4	23,8	10.707	23.605	105
30	1 1/4	3 3/4	407	40,7	27,3	12.135	26.752	119
32	1 5/16	4	463	46,3	31,1	13.664	30.124	134
34	1 11/32	4 1/4	525	52,5	35,3	15.398	33.946	151

More diameters available by demand.

In accordance to ISO 1346:2021.

- Raw Material: Polypropylene Split Film
- Specific Gravity: 0,91
- Melting Point: 165ºC
- Elongation at % of BS:
  25% …. 6,5%
  50% …. 12%

PP Film Packing Twine

With a production unit in Portugal, Cotesi offers a complete range of PP Film Packing solutions. Customized to your needs and presented in different shapes and sizes.

Packing Twine

Ref.	Runnage			Breaking Load		
	m/kg	ft/lb	tol.	kgf	lbf	kN
170/1	170	260	+/- 8%	210	463	2,1
220/1	220	330		160	353	1,6
300/1	300	450		122	269	1,2
350/1	350	520		103	227	1
450/1	450	650		81	179	0,8
500/1	500	750		72	159	0,7
570/1	570	850		63	139	0,6
700/1	700	1.050		51	112	0,5
900/1	900	1.350		40	88	0,4

Available in 1, 2, 3 and 4 ply in a shape of balls or spools.
Standard colour is Natural.

Applications

Commerce

General Usage

General Information

Rope Construction

Raw Materials

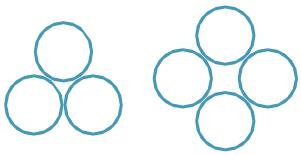
Care & Use

Glossary

Rope Construction

Rope construction plays an important role in resistance to wear and abrasion. Braided ropes have a round, smooth construction that tends to flatten out some-what on a bearing surface. This distributes the wear over a much greater area, as opposed to the crowns of a three-strand.

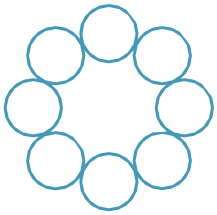
All ropes should be protected against sharp and abrasive surfaces. Wire ropes tend to score and gouge chocks and bitts creating cutting edges that can damage synthetic ropes. Weld beads on repaired capstands, fairleads, etc. are equally damaging unless dressed down smoothly.



3 / 4 Strands

3 OR 4 STRAND TWISTED

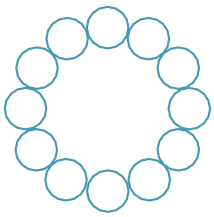
3 or 4 strands is the oldest and simplest rope construction, consisting of 3 or 4 twisted strands laid together. Twisted constructions may retain some torque, and therefore tend to kink up and to rotate under load. Twisted ropes are hard wearing and easily spliced.



8 Strands

8 STRAND BRAIDED

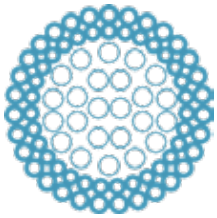
8 strand ropes also called square braided or plaited are constructed of left and right-hand laid strands to give a torque-free rope. They are easily spliceable and provide an excellent rope structure for mooring lines.



12 Strands

12 STRAND BRAIDED

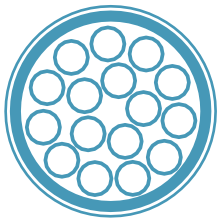
12 strand ropes are constructed of left and right-hand laid strands to give a torque-free balanced construction and its round shape provides excellent abrasion resistance due to a greater surface of contact and may offer higher breaking strengths over conventional constructions. They are easily spliceable and provide a good rope structure for mooring lines.



Double Braid

DOUBLE BRAID

Double Braided ropes are constructed of a braided cover over a braided core. Rope core and cover can be of different braided constructions being the most common one as a core braided 12 strand rope and as cover a 32 braids. As both cover and core play an important role in the rope breaking load, ratio between core and core must not exceed 60% core.



Jacketed Ropes

JACKET ROPES

Jacket ropes consist on cover over a load bearing core. Most common jackets are of 32 braids whilst the core can be either of a braided or multi parallel strands construction. A load bearing core jacket rope must have a core ratio no less than 70% of the rope. Jacket is used to finalize the rope and protect it during use.

Raw Materials

Different Fibers, Different Characteristics, Different Results

Fiber	Polyamide (PA) 6 unid 6,6	PES (Polyester)	PP (Polypropilene)	PP (Polypropilene) multifilament	PE (Polyethilene)	HMWPE	Mixed (Polyolefin)	Sisal
Brandname	Perlon Nylon Nylsuisse Enkalon	Diolen Trevira Dacron Ersuisse	Leolene Arova	Hostalen Softlene Leolene	Lupolen Vestalen Wetalen	Dyneema	-	-
Tenacity (GF/Denier)	7,5 to 10,5	7,5 to 10,5	6 to 6,5	6 to 6,5 7,3 to 9,5	5,5 to 9,5	32,8 to 39,8	6,5 to 8,5	2 to 2,5
Specific Gravity Kg/DM3	1,14	1,38	0,91	0,91	0,96	0,96	0,94	1,38
Elongation at Break %	14 to 28	14 to 18	14 to 18	20 to 24 16 to 20	16 to 24	3 to 3,5	12 to 18	3 to 12
Creep Resistance	Moderate	Low	High	High	High	Moderate	High	Very Low
Shock Load Absorption	Excellent	Very Good	Very Good	Very Good	Fair	Excellent	Good	Poor
Melting Point Cº	215 (PA) 255 (NYLON)	260	170	170	150	150	165	165
Water Absorption %	Yes	Yes	No	No	No	No	No	Yes
Dry Strength compared to wet Strength	85% - 90%	100%	100%	100%	105%	100%	100%	120%
UV Resistance	Good	Excellent	Fair	Fair	Fair	Excellent	Good	Good
Resistance to Abrasion	Very Good	Very Good	Fair	Fair	Fair	Good	Good	Fair

Table Based on the information provided by Cordage Institute Technical Service

EXTENSION AND ELASTICITY
Rope extension and elasticity are important features because they will establish rope behaviour in terms of peak loads. Load-extension characteristics of synthetic fiber ropes are non-linear and time dependent.
Several different components complete overall extension of a rope.

VISCOELASTIC EXTENSION
Viscoelastic extension is only recoverable some time after releasing the load. The performance of ropes subjected to occasional high loads will be significantly influenced by this viscoelastic component.

ELASTIC EXTENSION
Elastic extension is the immediately recoverable extension upon the release of the load and in a continuously working environment that dominates rope behaviour.

PERMANENT EXTENSION
Permanent extension is non-recoverable. It occurs when a new rope is first used or when subject to an unusually high load and is the result of the lay down of individual fiber components to their preferred positions. Continuous loading of some ropes can also lead to permanent extension.

Care & Use

STORAGE

Ropes should be stored on a dry and clean place, out of direct sunlight sources. When possible, it should be stored off the ground, away from metal walls or steam pipes, to allow adequate ventilation and away from chemicals of all types.

Never store rope on concrete or dirty floors, or drag over rough ground – dirt or sand picked up by the rope may cause cuttings on inside fibers during work. In case of long-term storage, ropes should be cleaned with fresh water to reduce salt crystals that may affect its life and efficiency.

HANDLING

When a rope is supplied in a coil it should always be uncoiled from the inside so that the first turn comes off from the bottom in a counter-clockwise direction. When supplied on reels, it must be allowed to freely rotate so that the rope can be drawn off the top layer. Never take rope from a reel lying on its side.

A wrong coil or uncoil on a twisted rope will provoke kinking and hockling. Three and four strand ropes should be coiled in a clockwise direction (in lay's direction) and uncoiled in a counterclockwise direction to avoid hockling and kinking.

Braided ropes can not be kinked or hockled, however, twist can be produced into ropes during service. Excessive twist may cause an imbalance between the right and left hand strands and should be removed as soon as possible by counter-rotating the rope when it is relaxed. The best method for storing both, braided and twisted ropes is in a eight figure fashion.

ROPE SAFETY

Never stand in line with a rope under tension. If a rope fails, it can draw back with sufficient force to cause serious injuries. Always ensure correct safety factors are being used.

ROPE INSPECTION

Avoid using ropes that show signs of aging and wear. Rope should be inspected regularly for evidence of chemical attack, kinking, and surface abrasion including major yarn or strand cuts and heat fusion indicated by glazed or heavy fuzzed areas.

Braided ropes should be examined along their entire length for areas of stiffening or inconsistent diameter, which can be a sign of internal damage or core failure due to overloading or severe shock loads. Both, outer and inner rope fibers contribute to the strength of the rope and when either is worn, rope is naturally weakened.

No type of visual inspection is a guarantee to an accurate determination of residual strength. When the fibers show wear in any given area, if limited to one small section, the damaged area may be cut out and re-spliced, otherwise the rope should be downgraded or replaced.

SPLICING AND KNOTS

The use of knots can reduce rope strength over fifty percent, so whenever possible splices should be used instead. Variations up to twenty five percent can occur with poor splicing or very short length. According to each situation, always take into consideration the corresponding reduction to the rope strength adjusting working loads accordingly. When splices are used, always use recommended splicing procedures of the manufacturer.

The length of an eye in a rope should be a minimum of three times, and preferably five times, the diameter of the item around which it is to be used. This will ensure that the angle between the two legs of the eye will not cause a tearing action to the throat of the eye. For instance, if the eye of a mooring line is passing around a 600 mm diameter bollard, then the eye should be a minimum of 1,80 meters.

BENDING RADIOUS

Sharp bends around any piece of equipment should be avoided as, under load, it decreases rope strength substantially and may cause premature damage and failure. The diameter on fixed pin terminations should be at least 3 times the rope diameter and on rotating sheave blocks, it should be 10 times the rope diameter for twisted ropes and 8 times the rope diameter for braided ropes

WORKING LOADS

Working loads are the loads that a rope is subjected to when in activity. They are normally expressed as a percentage of new rope strength and should not exceed 20% of published strengths (many industries are subject to special working loads regulations that supersede manufacturer’s recommendation).

When severe overloaded or shock loads takes place, rope can suffer damages and consequently strength losses without any visible indication, which may weaken the rope causing it to break on next use, even if used under normal working loads. Sharp bends should be avoided as, under load, it decreases rope strength substantially and can cause premature failure.

Glossary

Double Braid Ropes

Double Braided ropes are constructed of a braided cover over a braided core. Rope core and cover can be of different braided constructions being the most common one as core a braided 12 strand rope and as cover a 32 braids. As both cover and core play an important role in the rope breaking load, ratio between core and core must not exceed 60% core.

Double Leg Sling (Grommet)

Loop of rope made by splicing the ends together. Often used as a lifting sling.

Elastic Elongation

Occurs immediately when a load is applied. Disappears as soon as the load is removed.

Elongation

The amount by which a rope stretches. This value is usually a % in length change.

Jacketed ropes

Jacketed ropes consist on cover over a load bearing core. Most common jackets are of 32 braids whilst the core can be either of a braided or multi parallel strands construction. A load bearing core jacket rope must have a core ratio no less than 70% of the rope. Jacket is used to finalize the rope and protect it during use.

LDBF - Line Design Break Force

This is the minimum force at which a new dry, spliced mooring line will break when tested according to MEG4. This applies to all mooring lines with exception of Nylon, which should be tested in a wet condition. MEG4 states that LDBF should have a value between 100% and 105% of the ship design.

MBL - Minimum Break Load

A value that indicates the minimum load or force to be achieved by the rope/line.

Seize

Similar to whipping, often used to bind 2 ropes together with smaller cordage, or to form an eye.

Single Leg Sling

Length of rope formed into a sling by having an eye spliced at each end of it.

Splicing

Method of joining a rope to itself or to another rope, or of producing an eye at the end of the rope. Splicing is done by interweaving the strands of the rope.

TDBF - Tail Design Breaking Force

Mooring tails experience more wear in service than mooring lines. For this reason, the Tail Design Breaking Force needs to be higher than the LDBF. The TDBF should be between 125% and 130% of the ship design MBL. The manufacturer states the TDBF on each mooring tail manufacturer's certificate and on the technical datasheet of the product. Please be aware that the TDBF is tested and defined in a wet condition. So, this is different from the situation for the LDBF.

Twist

''S" twist or ''S" lay is a left hand lay. When in a vertical position, the spirals of the rope incline in the same direction as the center of the letter ''S''. ''Z" Twist or' 'Z" lay is a right hand lay. When it is held in a vertical position, the spirals of the rope incline in the same direction as the center of the letter Z.

Whipping

Binding around the rope made with smaller diameter cordage. Used to tidy a rope end or to secure a splice.

3 or 4 Strand Ropes

Is the simplest rope construction. 3 or 4 twisted strands laid together. Twisted ropes are hard wearing and easily spliced.

8 Strand Ropes

Known as plaited ropes. They are composed of 8 strands grouped into 4 pairs. 2 of these pairs turn to the left and 2 pairs turn to the right.

12 Strand Ropes

12 strand ropes give a rounder and smoother rope than 8 strands one. This is the ideal construction for rope cores and high strength braids. Like 8-braid ropes, 12-braid ropes are very easy to splice.

INDUSTRIAL

LIFTING

OFF ROAD

SAFETY ROPES

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