LANKHORST

THE VITAL CONNECTION

MA MARITIME

CRUISE.

WIRECO
A World Ahead

CONTENTS

LANKHORST ROPES... THE VITAL CONNECTION

Lankhorst Ropes is a world leading supplier of synthetic fibre and steel wire ropes for the maritime and offshore industries. As a Royal Lankhorst Euronete Group company, Lankhorst Ropes is also part of the world's largest steel wire manufacturer, WireCo.

Founded in 1803, Lankhorst Ropes has over 200 years' experience in the manufacture and supply of high performance ropes for mooring and towing applications.

Our core business is the development and production of high performance, synthetic and steel wire ropes for mooring and anchor systems, as well as towing and crane hoisting and luffing applications. We are committed to setting the standard for maritime ropes through our leading rope brands - TIPTO® 'Strong & Durable' family, EURO 'Strong & Stretch' family and LANKO® 'Strong & Light' family, which provide an optimal combination of breaking strength, life-time safety and ease of handling. All our ropes are produced in accordance with OCIMF recommendations and ISO standards.

As a supplier of steel wire ropes, Lankhorst Ropes has direct access to WireCo's large steel wire manufacturing resource and leading wire rope brands, like Casar. Our design team has many years' experience in applications using both synthetic and steel ropes. Lankhorst offers a one-stop shop for synthetic and steel wire ropes to shipping and offshore companies globally; and we are the key player for new build ships' initial rope supply.

RELIABILITY AND SAFETY

Lankhorst Ropes is fully certified according to ISO 9001:2015. Quality is central to our business ethos, ensuring you benefit from the highest quality products and services. Our factories for both steel wire and fibre ropes are approved by many IACS members, such as Lloyds, DNV/GL, BV and ABS. In addition, Lankhorst Ropes incorporates features like higher visibility, traceability and lower weight in their ropes, making them easier and safer to use.

INNOVATION AND HIGH PERFORMANCE

Lankhorst Ropes has a reputation for excellence in product innovation. Lankhorst Ropes has developed several multi-award winning rope innovations, which have led the industry in rope handling and safety. Lankhorst Ropes is leader in providing extraordinary solutions in terms of breaking strength, service wwlife and ease of rope handling.

LANKHORST

SERVICE AND DELIVERY

Lankhorst Ropes maintains stock points at strategic locations and main ports worldwide. Thanks to our widespread network and global presence, you are ensured continuity of supply, fast service and short delivery times. Our global network of stock points, local sales offices and factories includes Bilbao, Brisbane, Dordrecht (NL), Dubai, Fujairah, Houston, Maia (PT), Philadelphia, Rio de Janeiro, Rotterdam, Singapore and Sneek (NL).

PARTNER AND PROBLEM SOLVER

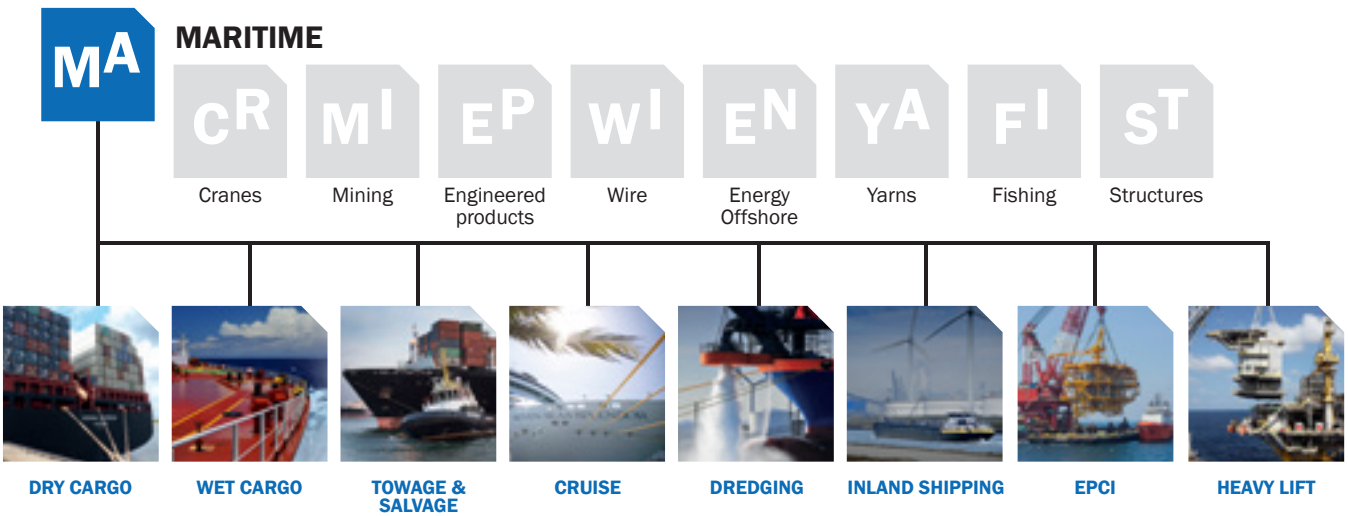
Lankhorst Ropes develops, manufactures and supplies a broad range of ropes directly from stock. Besides fast supply of standard items and rope configurations, Lankhorst Ropes has a dedicated confectioning centre to meet the needs of different market segment demands for specialized and tailor made solutions. In close consultation with our clients, we can bring nearly any desired product to market.

ENVIRONMENTAL, SOCIAL AND GOVERNMENTAL POLICY

While the growing recognition among governments and corporations of the potential effects of climate change certainly informs our thinking on sustainability, we're proud that it has taken hold as a grass-roots movement at our company. We, as an organization, must make a commitment to leave the world a better place than we found it. Sustainability thus became a foundational commitment for us which led us to take near-term steps to formalize existing sustainability efforts and begin to lay the foundation for a comprehensive sustainability program.

For example in synthetics, scrap rope and yarn is recycled in our facility in Maia, Portugal for use in new products. Not only does this make financial sense by reducing disposal and raw material costs, but it also creates circularity in the manufacturing process that reduces waste and enables a degree of self-sufficiency. At Lankhorst Engineered Products business goes even further to give used plastics new life through Lankhorst Recycling, a product line sourced primarily with recycled materials. Based in Sneek, The Netherlands, Engineered Products has been recognized throughout Europe for its leadership in repurposing discarded polyethylene and polypropylene goods for use in construction, agriculture, recreation, and landscaping.

In our Environmental, Social, and Governance (ESG) journey tremendous work is already taking place in the areas of recycling, responsible sourcing, community engagement, and in our support of sustainable industries. Please find out more about our activities in our ESG report on our website.



LANKHORST ROPES FOR CRUISE VESSELS

OUTSTANDING SERVICE LIFE PERFORMANCE AND, AS A RESULT, LOW TOTAL COST OF OWNERSHIP.

Lankhorst Ropes offers a one-stop shop for a broad range of fibre and steel wire ropes for hoisting, luffing, and mooring for both river and ocean cruise vessels. They offer outstanding service life performance and, as a result, low total cost of ownership and minimal downtime.

One of Lankhorst Ropes' greatest strengths is the ability to draw on the expertise and applications experience of its staff to find a rope to meet the customer's needs. Lankhorst offers a range of materials and rope handling tools that can be deployed to meet the requirements of a wide variety of applications and vessels. Ease of handling, and rope safety are the trademark of Lankhorst Ropes as shown by Lankhorst's award winning innovations. The non-loadbearing braided jacket protects the rope from abrasion.

Manufactured in the EU using the latest in-house yarn extrusion and rope production techniques, rope construction is optimised to suit the application. All Lankhorst ropes are manufactured from premium materials tested to OCIMF recommendations and offer full rope traceability. Moreover we work closely with our suppliers ensuring the highest quality standards from raw materials, through to the manufacture, delivery and installation of the finished rope.

Consistent rope performance is vital during mooring and towing. Using Lankhorst ropes, vessel operators are assured that their ropes are made with the greatest materials consistency to provide the same elongation, and service life, enabling more efficient rope management and supply through Lankhorst Ropes' extensive global stock point network. In this way, the risk of mixed mooring is reduced to zero.

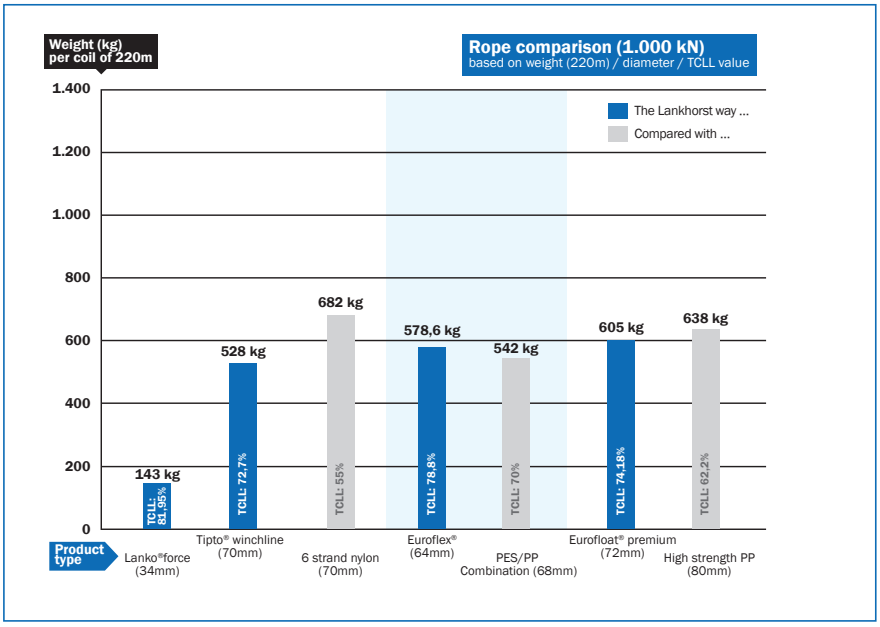
LANKHORST

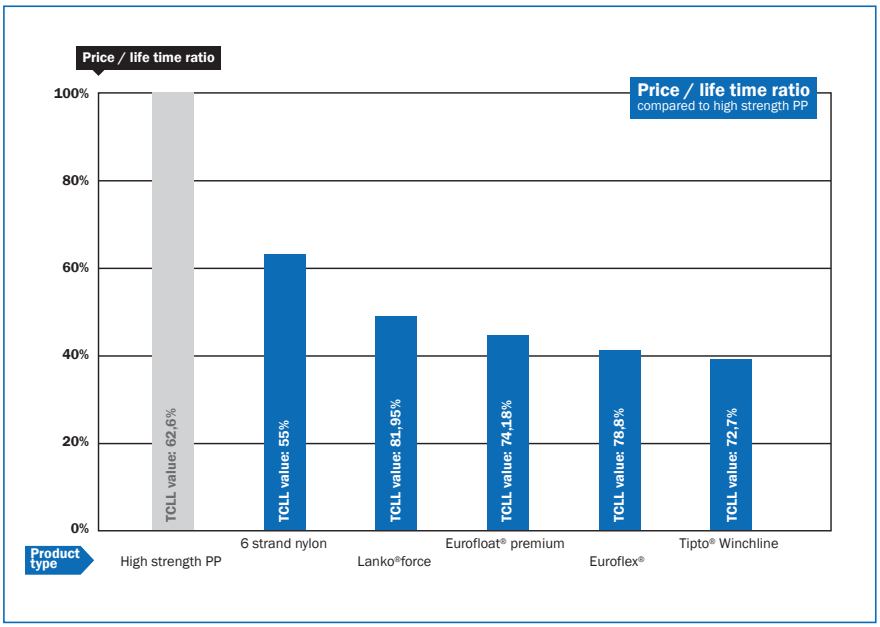
Lankhorst has a dedicated fibre rope R&D centre providing the technical know-how needed to produce award-winning rope innovations in rope handling and safety. A3 splice makes rope handling easier and safer during mooring and towing.

Lankhorst Ropes 'Your' partner for new build and replacement ropes. The breadth and depth of our range of fibre and steel wire ropes, backed by a global network of stock points, means we are able to provide complete fleet supply ensuring your cruise shipping operations remain efficient and cost-effective.

OUR ROPE SYSTEM

± 1.000 kN coil of 220m	Lanko®force	Tipto® winchline	Euroflex®	Eurofloat® premium
Density	0,98	0,93	1,14	0,98
Melting point (°C)	147 °C	140 °C	165-265 °C	165-260 °C
Dry / wet (%)	100%	100%	100%	100%
Used Rope elongation (%)	1%	4,5%	8%	9%
UV resistance	excellent	very good	good	good
TCLL value (%)	81,95%	72,7%	78,8%	74,18%





‘THROUGH LIFE, FOR LIFE’ SERVICE MODEL

The cost and operational demands on cruise operators have never been greater. Maintaining a competitive edge is often the sum of marginal gains, small improvements, which when taken together can make a big difference. Lankhorst Ropes’ Through Life, For Life service is designed to do just this.

Lankhorst Ropes: Through Life, For Life gives operators a cost-effective portfolio of rope service life support and sustainability benefits unmatched in the industry.

From rope selection to management through predictive service-life rope testing and training, Lankhorst provides complete ‘through life’ rope service – we want you to experience the benefit of working with our ropes in terms of longer rope service-life, easier handling and safe operation.

And then we go further. Commitment to Green manufacture combined with a longer lasting rope service-life, and ultimately rope recycling, translates into levels of sustainability that make a significant contribution to your environmental policies. Looked at in this way, life enhancing, sustainability is built-in with Lankhorst Ropes: Through Life, For Life; and it makes good business sense too!

STEP 1 ROPE SELECTION

ROPE SELECTION

Making the correct rope selection is vital. The cost-effectiveness and safety of shipping operations are dependent on selecting the correct rope. Lankhorst takes a holistic approach to prevent early failure of the rope:

- Review of ship route and mooring conditions

We will jointly go through all details of the trading route (if known) including type of mooring, expected swell conditions, possible currents and risks of surging.

- Review of the mooring plan

We will jointly go through all details of the rope route starting from the winch, and calculated winch capacity, to analysis of D/d ratios.

ROPE SELECTION CRITERIA

Based on the holistic analyses, Lankhorst will recommend a rope to meet the desired properties for:

- Elongation
- Rope flexibility/stiffness
- Twist impact
- Break load
- Chafing gear
- Safety risks
- Buoyancy
- Service life expectations
- Environmental conditions
- International standards.

STEP 2 ROPE INSTALLATION AND CREW TRAINING

Lankhorst Ropes is committed to equipping crew with the knowledge and skills needed to ensure safe use of fibre ropes and maximum service life. Specifically, we provide:

- Training on rope handling
- Splicing instructions
- Installation on new (shipyard) or existing (ports) vessels
- Hardware inspection including all on-vessel equipment.

STEP 3 INSPECTION / MAINTENANCE ADVICE / TRAINING

Regular inspection is important in ensuring maximum rope service life. In addition to the crew training on rope handling and inspection, Lankhorst Ropes will make periodic visits to the vessel in port to undertake:

- Hardware condition inspection
- Rope inspection
- Update crew training
- Provide inspection reports.

STEP 4 RESIDUAL STRENGTH TESTING

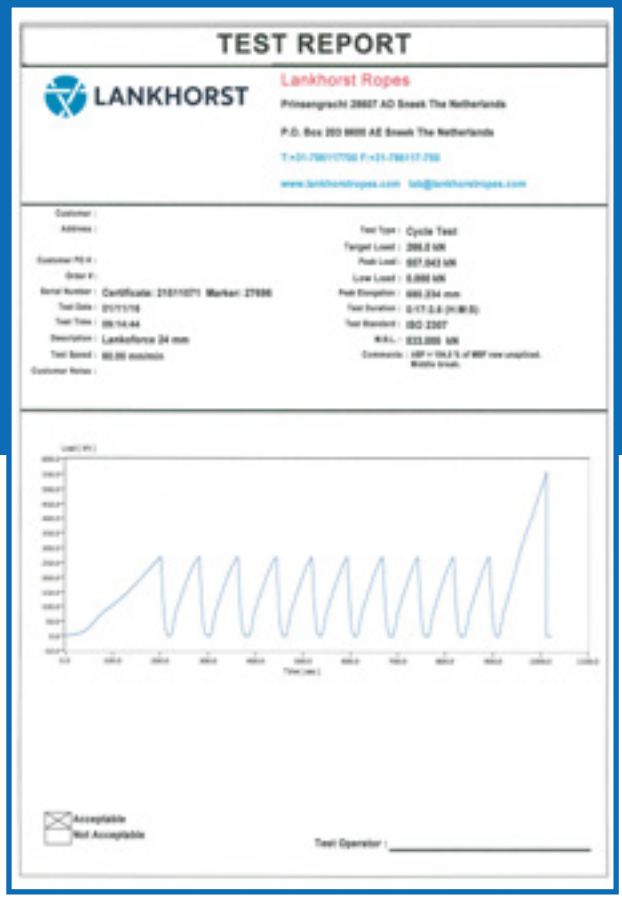
Lankhorst Ropes will provide a continuous residual strength testing program in order to assist in determining the best moment to change the rope end-to-end in order to ensure the most economical life time and to optimise safety on board. We believe this should be based on mooring hours, i.e. the number of hours a line has been used in mooring the vessel. This can be quantified by vessel and reported back to the manufacturer. Other factors which should be taken into consideration during the review are local environmental conditions at the ports and terminals where the vessel will be moored.

VISUAL INSPECTION

The rope-sample is visually inspected. Photos are taken for the final residual strength test report before pulling the sample to destruction.

TEST REPORT

Each sample will get its own test certificate as illustrated.

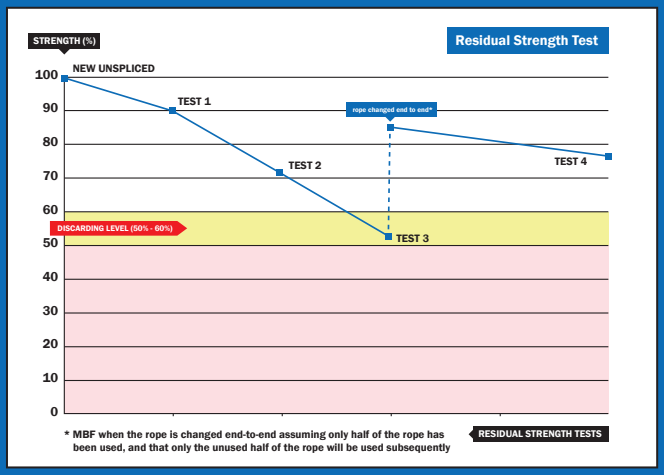

TEST REPORT

LANKHORST

Lankhorst Ropes

DEVELOPING SAFE RETIREMENT CRITERIA

By a continuous process of analysis and testing, it is possible to determine the most economical and safest points for ending rope usage and ultimately rope retirement.



THROUGH LIFE, FOR LIFE

Longer rope service-life, easier handling, safe operation, green manufacture and rope recycling.

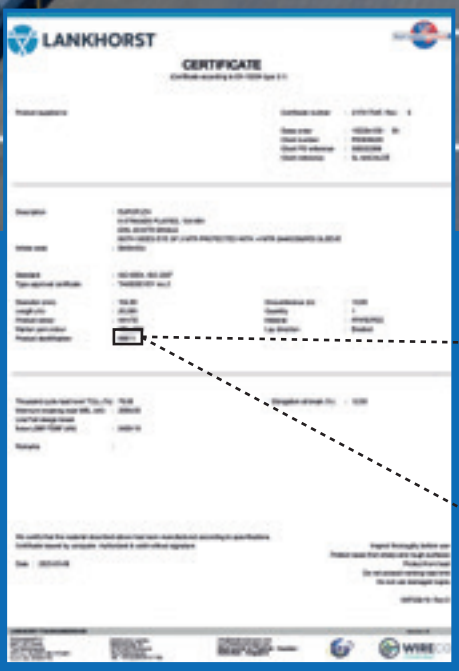
STEP 5 RECYCLING OF ROPES

RECYCLING OF ROPES

The rope testing and recycling programmes can be combined. Ropes which are returned for testing and deemed unusable, can be used for recycling into other polymer products. The image below shows an offshore vessel with KLP® Deck Covers made by Lankhorst Engineered Products.

The recycling programme is an exclusive programme. It is not meant for ad hoc single rope returning for recycling as an alternative to disposal by our customers. The intention is that the whole fleet's ropes will be recycled in time.

Check the rope selection pages to find out which products participate in the recycling programme.



ROPE TRACEABILITY

Record keeping is essential for the safe use of mooring and towing ropes. Lankhorst high performance ropes carry a unique Product Identification Code (PIC). This PIC code is printed on a tape inside the rope and on the protective barrier in the eye. It corresponds with the factory certificate number for each rope, providing an effective way of managing rope use and maintenance.

24/7 ONLINE ACCESS TO ROPE CERTIFICATES

Lankhorst Ropes offer 24/7 online access to fibre rope and steel wire rope certificates, regardless of the time zone. It provides as standard a manufacturer's certificate for each individual mooring line, connecting shackle and tail. Certificates may be mislaid during filing or transportation but can be required immediately to trace and identify ropes. By having direct access to rope certificates, Lankhorst customers are able to instantaneously check all of their ropes' details including construction, diameter, length, minimum breaking load and end termination. Please contact your accountmanager at Lankhorst Ropes for activation.

Furthermore, Lankhorst Ropes has a DNV GL type approval for the manufacture of synthetic ropes used for mooring and towing. Check the synthetic rope selection pages to find out for which product a DNV F497 'Certificate of Test and Examination of Fibre Ropes' may be ordered.

ROPE SOLUTION OVERVIEW

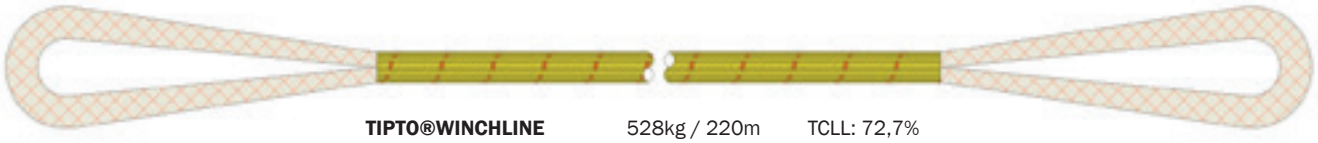
Mooring lines

single

LANKO®FORCE ø 34mm	143kg / 220m MBF: 991 kN	TCLL: 81,95%	**EWL tails of EUROFLEX®** ø 72mm	53,7 kg / 11m MBF: 1.270 kN	TCLL: 78,8%

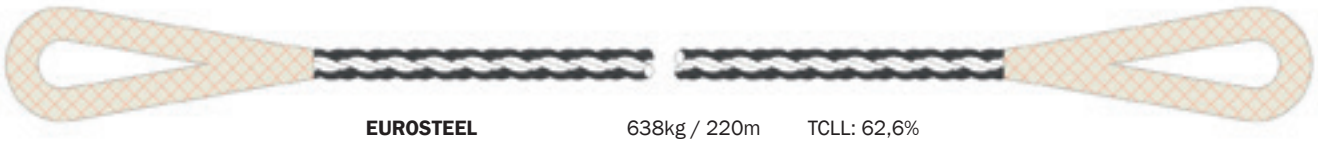
double

LANKO®FORCE ø 34mm	143kg / 220m MBF: 991 kN	TCLL: 81,95%	**EWL tails of EUROFLEX®** ø 72mm	46 kg / 11m MBF: 1.332 kN	TCLL: 78,8%



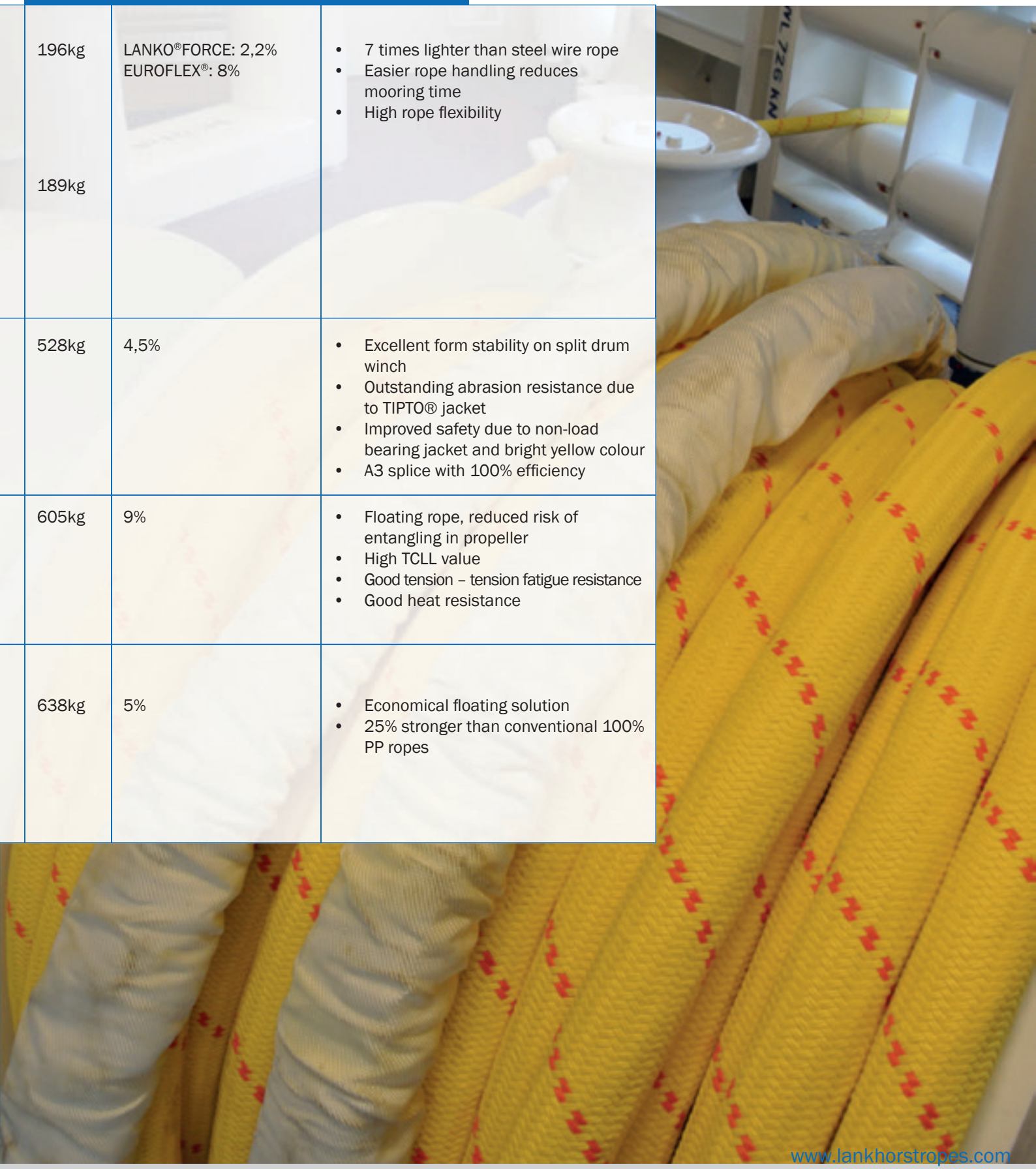
TIPTO®WINCHLINE ø 70mm	528kg / 220m MBF: 990 kN	TCLL: 72,7%

EUROFLOAT® PREMIUM ø 72mm	605kg / 220m MBF: 1.000 kN	TCLL: 74,18%



EUROSTEEL ø 80mm	638kg / 220m MBF: 1.009 kN	TCLL: 62,6%

Total weight	Elongation of used rope at break	Features
196kg 189kg	LANKO®FORCE: 2,2% EUROFLEX®: 8%	• 7 times lighter than steel wire rope • Easier rope handling reduces mooring time • High rope flexibility
528kg	4,5%	• Excellent form stability on split drum winch • Outstanding abrasion resistance due to TIPTO® jacket • Improved safety due to non-load bearing jacket and bright yellow colour • A3 splice with 100% efficiency
605kg	9%	• Floating rope, reduced risk of entangling in propeller • High TCLL value • Good tension – tension fatigue resistance • Good heat resistance
638kg	5%	• Economical floating solution • 25% stronger than conventional 100% PP ropes



ROPE SELECTION

SYNTHETIC ROPES

HIGH MODULUS ROPES

LANKO®FORCE

12 strand braided rope, made of Dyneema® yarns. LANKO®FORCE is an excellent alternative for heavy and lumbersome steel wire ropes in situations requiring manual handling of the rope. It is stronger than conventional steel wire rope, yet the corresponding weight is 7 times lower. The improved handling characteristics are especially suitable for towing and mooring applications. Another important benefit of LANKO®FORCE is that the rope is floating. Moreover, when replacing fibre rope, the reduction in rope diameter can lead to substantial savings in the weight and size of the mooring winches, for example, when incorporated in the design of a new build vessel the cost saving is substantial. Available in 12 x 1 construction (up to 86mm) and 12 x 3 construction (from 88mm). In a 12 x 3 construction each strand is a 3 strand rope.

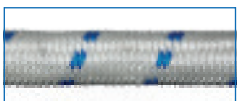
SPECIFIC GRAVITY	0,98 (floating)
UV-RESISTANCE	excellent
ABRASION RESISTANCE	excellent
CHEMICAL RESISTANCE	very good
MELTING POINT	approx. 147 °C
CONSTRUCTION	12x1 strand braided up to 86mm 12x3 strand braided from 88mm
TCLL VALUE	81,95% (with 100% residual strength)
COLOUR	yellow
WATER ABSORPTION	0%
ELONGATION	see graph for illustration purposes

nominal diameter		weight		minimum breaking force ISO2307			spliced /LDBF (OCIMF MEG4)	
mm	inch	kg/100m	lb/100ft	lbs	kN	t(metric)	kN	t(metric)
20	13/16	21,5	14,4	84.079	374	38,1	337	34,3
22	7/8	28,0	18,8	101.164	450	45,9	405	41,3
24	1	33,5	22,5	119.823	533	54,3	480	48,9
26	1 1/16	38,5	25,9	137.583	612	62,4	551	56,1
28	1 1/8	43,5	29,2	157.591	701	71,5	631	64,3
30	1 1/4	51,5	34,6	177.374	789	80,4	710	72,4
32	1 5/16	59,0	39,6	199.405	887	90,4	798	81,4
34	1 3/8	65,0	43,7	222.786	991	101	892	90,9
36	1 1/2	71,0	47,7	241.894	1.076	109,7	968	98,7
38	1 9/16	80,0	53,8	267.747	1.191	121,4	1.072	109,3
40	1 5/8	88,5	59,5	295.399	1.314	133,9	1.183	120,6
42	1 11/16	98,0	65,9	319.229	1.420	144,8	1.278	130,3
43	1 23/32	103,0	69,2	334.965	1.490	151,9	1.341	136,7
44	1 3/4	109,0	73,2	350.477	1.559	158,9	1.403	143,0
45	1 13/16	114,0	76,6	366.439	1.630	166,2	1.467	149,5
46	1 7/8	117,0	78,6	391.392	1.741	177,5	1.567	159,7
48	2	126,0	84,7	416.571	1.853	188,9	1.668	170,0
50	2 1/16	137,0	92,1	449.618	2.000	203,9	1.800	183,5
52	2 1/8	149,0	100,1	485.587	2.160	220,2	1.944	198,2
54	2 3/16	162,0	108,9	515.037	2.291	233,5	2.062	210,2
56	2 1/4	176,0	118,3	559.774	2.490	253,8	2.241	228,4
60	2 1/2	202,0	135,7	633.961	2.820	287,5	2.538	258,7

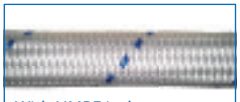
Other diameters on request

Diameter, weight and MBF (as well as other mechanical and physical properties) are determined according ISO 2307. The MBF refers to the breaking strength of the rope without splices or any other form of termination that can be formed with or without the use of accessories / fittings. The figures in red refer to the Line Design Breaking Force (LDBF) in spliced dry condition and products are manufactured, tested and documented according to OCIMF guideline MEG4 Appendix B.

optional:

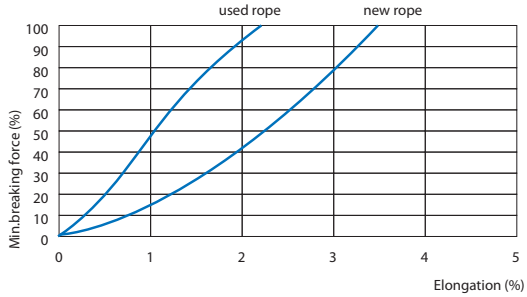


With polyester jacket



With HMPE jacket

ELONGATION:



WINCHLINES

TIPTO®WINCHLINE

A dedicated floating winch line for self-tensioning winches. This load-bearing 7 strand core combines high strength and relatively low elongation. The non-load-bearing braided jacket provides protection of the core for longer service life. The mooring efficiency of the vessel is enhanced by the ease of handling of the rope due to its low weight and ability to float. TIPTO®WINCHLINE does not lose its strength when wet.

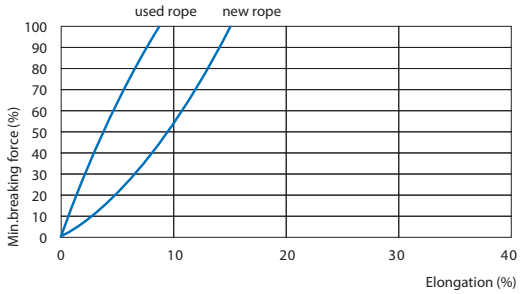
SPECIFIC GRAVITY	0,93 (floating)
UV-RESISTANCE	very good
ABRASION RESISTANCE	very good
CHEMICAL RESISTANCE	good
MELTING POINT	approx. 140°C
CONSTRUCTION	7 strand + jacket
TCLL VALUE	70,7%
COLOUR	yellow
MARKER YARN	orange
WATER ABSORPTION	0%
ELONGATION	see graph for illustration purposes
A3 SPLICE	standard

nominal diameter		weight		minimum breaking force ISO2307			spliced	
mm	inch	kg/100m	lb/100ft	lbs	kN	t(metric)	kN	t(metric)
36	1 1/2	74,0	49,7	55.753	248	25,3	223	22,8
42	1 11/16	98,0	65,9	76.435	340	34,7	306	31,2
46	1 7/8	115,0	77,3	95.544	425	43,3	383	39,0
48	2	125,0	84,0	106.110	472	48,1	425	43,3
50	2 1/16	133,0	89,4	115.102	512	52,2	461	47,0
54	2 3/16	150,0	100,8	134.436	598	61,0	538	54,9
56	2 1/4	160,0	107,5	143.878	640	65,2	576	58,7
58	2 5/16	167,0	112,2	153.320	682	69,5	614	62,6
60	2 1/2	184,0	123,6	164.110	730	74,4	657	67,0
62	2 9/16	190,0	127,7	175.351	780	79,5	702	71,6
64	2 5/8	203,0	136,4	191.088	850	86,6	765	78,0
68	2 3/4	221,0	148,5	209.972	934	95,2	841	85,7
70	2 7/8	240,0	161,3	222.561	990	100,9	891	90,8
74	3	256,0	172,0	247.290	1.100	112,1	990	100,9
80	3 3/16	355,0	238,5	285.507	1.270	129,5	1.143	116,5
82	3 1/4	380,0	255,3	303.492	1.350	137,6	1.215	123,9
84	3 5/16	395,0	265,4	319.229	1.420	144,8	1.278	130,3

other diameters on request

Diameter, weight and MBF (as well as other mechanical and physical properties) are determined according ISO 2307. The MBF refers to the breaking strength of the rope without splices or any other form of termination that can be formed with or without the use of accessories / fittings.

ELONGATION:



EUROFLOAT®PREMIUM

Using our latest in-house extrusion technology, Lankhorst has developed EUROFLOAT®PREMIUM rope to meet the requirements of today's modern tanker fleet. This floating high performance rope is constructed from high strength polyolefin and polyester yarns. It is manufactured to the latest EN and ISO standards, and complies with OCIMF recommendations. The rope's floating characteristic makes it a safe rope to work with, while its high TCLL value ensures excellent fatigue resistance.

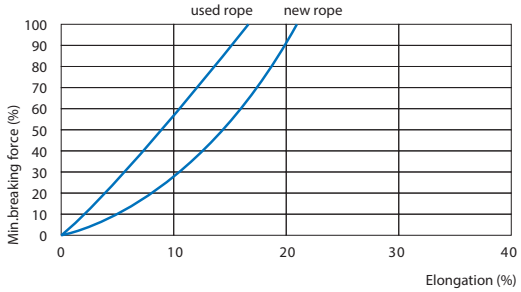
SPECIFIC GRAVITY	0,98 (floating)
UV-RESISTANCE	good
ABRASION RESISTANCE	very good
CHEMICAL RESISTANCE	good
MELTING POINT	approx. 165°C/ 260°C
CONSTRUCTION	8 strand braided
TCLL VALUE	74,18%
COLOUR	off white
MARKER YARN	double green markers
WATER ABSORPTION	0,1%
ELONGATION	see graph for illustration purposes

SOFT ROPES

nominal diameter		weight		minimum breaking force ISO2307			spliced/LDBF (OCIMF MEG4)	
mm	inch	kg/100m	lb/100ft	lbs	kN	t(metric)	kN	t(metric)
32	1 5/16	53,0	35,6	46.535	207	21,1	186	19,0
36	1 1/2	67,0	45,0	58.226	259	26,4	233	23,8
40	1 5/8	85,0	57,1	72.838	324	33,0	292	29,7
44	1 3/4	99,0	66,5	84.753	377	38,4	339	34,6
48	2	120,0	80,6	102.513	456	46,5	410	41,8
52	2 1/8	141,0	94,7	120.048	534	54,4	481	49,0
56	2 1/4	162,0	108,9	137.808	613	62,5	552	56,2
60	2 1/2	188,0	126,3	157.591	701	71,5	631	64,3
64	2 5/8	216,0	145,1	179.622	799	81,4	719	73,3
68	2 3/4	245,0	164,6	202.328	900	91,7	810	82,6
72	2 15/16	275,0	184,8	224.809	1.000	101,9	900	91,7
76	3 1/16	305,0	205,0	246.840	1.098	111,9	988	100,7
80	3 3/16	339,0	227,8	270.895	1.205	122,8	1.085	110,6
88	3 7/16	411,0	276,2	330.469	1.470	149,8	1.323	134,9
96	3 3/4	490,0	329,3	390.043	1.735	176,9	1.562	159,2

Diameter, weight and MBF (as well as other mechanical and physical properties) are determined according ISO 2307. The MBF refers to the breaking strength of the rope without splices or any other form of termination that can be formed with or without the use of accessories / fittings. The figures in red refer to the Line Design Breaking Force (LDBF) in spliced dry condition and products are manufactured, tested and documented according to OCIMF guideline MEG4 Appendix B.

ELONGATION:



LANKHORST

EUROFLEX®MOORING TAIL

Mooring tails absorb shock/ energy within the mooring system. The EUROFLEX® MOORING TAILS surpass nylon tails in quality. Moreover, the rope does not lose a large portion of its dry MBF when wet. As the EUROFLEX® MOORING TAILS' strength is higher than that of nylon, a smaller diameter of rope can be used, providing better handling. Made of polyester and polyolefin composite yarns, the standard length is 11 m (Effective Working Length). For those circumstances where more stretch is required, the EUROFLEX® MOORING TAILS are also available in 22 m EWL. Both versions are fitted with two protected and spliced eyes of 2 m and 1 m respectively.

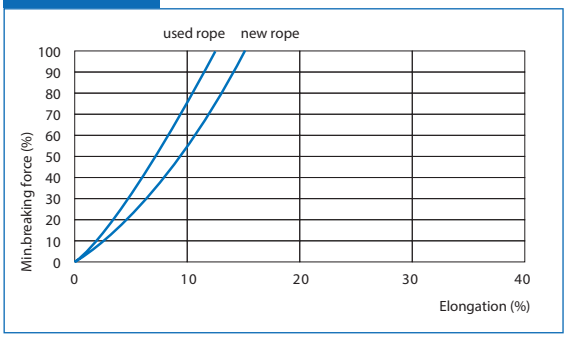
OCIMF MEG4 guidelines recommend mooring tails with a TDBF of 125 - 130% related to the ship design MBL. EUROFLEX® MOORING TAILS have equal breaking strength under wet and dry conditions.

nominal diameter		weight		minimum breaking force ISO2307			spliced/TDBF (OCIMF MEG4)	
mm	inch	kg/100m	lb/100ft	lbs	kN	t(metric)	kN	t(metric)
EWL: 11m								
48	2	23,7	15,9	137.583	612	62,4	551	56,1
56	2 1/4	34,2	23,0	185.018	823	83,9	741	75,5
60	2 1/2	39,3	26,4	211.545	941	95,9	847	86,3
62	2 9/16	42,0	28,2	224.809	1.000	101,9	900	91,7
64	2 5/8	44,7	30,0	238.522	1.061	108,2	955	97,3
68	2 3/4	50,3	33,8	269.096	1.197	122,0	1.077	109,8
72	2 15/16	56,4	37,9	299.895	1.334	136,0	1.201	122,4
76	3 1/16	66,6	44,8	332.942	1.481	151,0	1.333	135,9
80	3 3/16	70,4	47,3	365.989	1.628	166,0	1.465	149,4
82	3 1/4	73,2	49,2	382.400	1.701	173,4	1.531	156,1
83	3 2/7	75,0	50,4	391.617	1.742	177,6	1.568	159,8
84	3 5/16	81,4	54,7	401.284	1.785	182,0	1.607	163,8
88	3 7/16	89,5	60,1	441.525	1.964	200,2	1.768	180,2
96	3 3/4	106,2	71,4	521.781	2.321	236,6	2.089	212,9
EWL: 22m								
60	2 1/2	64,7	43,5	211.545	941	95,9	847	86,3
72	2 15/16	93,0	62,5	299.895	1.334	136,0	1.201	122,4
80	3 3/16	119,2	80,1	365.989	1.628	166,0	1.465	149,4
88	3 7/16	144,1	96,8	441.525	1.964	200,2	1.768	180,2
96	3 3/4	171,1	115,0	521.781	2.321	236,6	2.089	212,9

Diameter, weight and MBF (as well as other mechanical and physical properties) are determined according ISO 2307. The MBF refers to the breaking strength of the rope without splices or any other form of termination that can be formed with or without the use of accessories / fittings. The figures in red refer to the Tail Design Breaking Force (TDBF) in spliced wet condition and products are manufactured, tested and documented according to OCIMF guideline MEG4 Appendix B.

SPECIFIC GRAVITY	1,14	CONSTRUCTION	8 strand braided
UV-RESISTANCE	good	TCLL VALUE	78,8%
ABRASION RESISTANCE	very good	COLOUR	white
CHEMICAL RESISTANCE	good	MARKER YARN	yellow
MELTING POINT	approx. 165°C /265°C	WATER ABSORPTION	<0,5%
		ELONGATION	see graph for illustration purposes

ELONGATION:



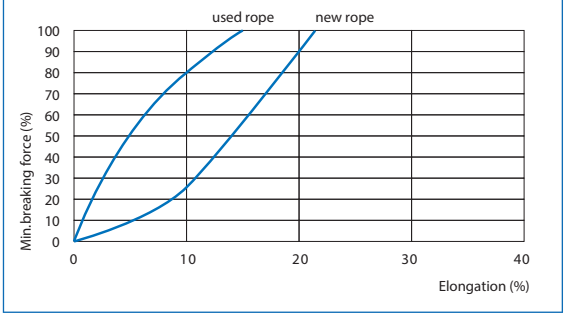
TIPTO®EIGHT

A high-performance mooring rope, TIPTO®EIGHT's strength, abrasion resistance and energy absorption ensure a long service life and low cost of ownership. The rope's small diameter and low weight make handling easier on board. As TIPTO®EIGHT is a floating rope, the risk of getting the rope caught in the ship and tug propeller is minimal, thus avoiding costly downtime.

nominal diameter		weight		minimum breaking force ISO2307			spliced	
mm	inch	kg/100m	lb/100ft	lbs	kN	t(metric)	kN	t(metric)
40	1 5/8	75,6	50,8	60.474	269	27,4	242	24,7
44	1 3/4	92,4	62,1	72.164	321	32,7	289	29,4
48	2	109,0	73,2	84.978	378	38,5	340	34,7
52	2 1/8	128,0	86,0	99.141	441	45,0	397	40,5
56	2 1/4	149,0	100,1	114.203	508	51,8	457	46,6
60	2 1/2	171,0	114,9	129.940	578	58,9	520	53,0
64	2 5/8	194,0	130,4	146.351	651	66,4	586	59,7
68	2 3/4	220,0	147,8	164.335	731	74,5	658	67,1
72	2 15/16	246,0	165,3	182.994	814	83,0	733	74,7
80	3 3/16	305,0	205,0	223.010	992	101,1	893	91,0
88	3 7/16	369,0	248,0	265.275	1.180	120,3	1.062	108,3
96	3 3/4	438,0	294,3	314.732	1.400	142,7	1.260	128,4
104	4 1/8	515,0	346,1	364.190	1.620	165,1	1.458	148,6
112	4 7/16	596,0	400,5	420.393	1.870	190,6	1.683	171,6
120	4 3/4	686,0	461,0	478.843	2.130	217,1	1.917	195,4
128	5 1/16	779,0	523,5	541.789	2.410	245,7	2.169	221,1
136	5 3/8	880,0	591,3	609.232	2.710	276,2	2.439	248,6
144	5 11/16	987,0	663,2	681.171	3.030	308,9	2.727	278,0

Diameter, weight and MBF (as well as other mechanical and physical properties) are determined according ISO 2307. The MBF refers to the breaking strength of the rope without splices or any other form of termination that can be formed with or without the use of accessories / fittings.

ELONGATION:



SPECIFIC GRAVITY	0,93 (floating)	COLOUR	yellow
UV-RESISTANCE	very good	MARKER YARN	orange
ABRASION RESISTANCE	very good	WATER ABSORPTION	0%
CHEMICAL RESISTANCE	good	ELONGATION	see graph for illustration purposes
MELTING POINT	approx. 140°C		
CONSTRUCTION	8 strand braided		

EUROSTEEL

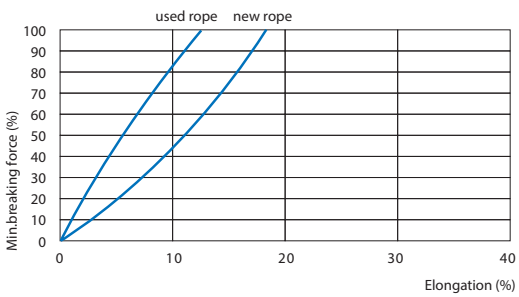
An all purpose 8 strand braided mooring rope made from high strength monofilament fiber. The EUROSTEEL rope does not absorb water, has a high breaking load in relation to the diameter of the rope, whilst still floating. The EUROSTEEL rope is designed as general purpose rope and can be used for various applications, such as mooring and towing

SPECIFIC GRAVITY	0,91 (floating)
UV-RESISTANCE	good
ABRASION RESISTANCE	good
CHEMICAL RESISTANCE	good
MELTING POINT	approx. 169°C
CONSTRUCTION	8 strand braided
COLOUR	black & white
WATER ABSORPTION	0%
ELONGATION	see graph for illustration purposes

nominal diameter		weight		minimum breaking force ISO2307			minimum breaking force spliced	
mm	inch	kg/100m	lb/100ft	lbs	kN	t(metric)	kN	t(metric)
52	2 1/8	122,0	82,0	100.040	445	45,4	401	40,8
56	2 1/4	142,0	95,4	114.428	509	51,9	458	46,7
60	2 1/2	163,0	109,5	131.064	583	59,4	525	53,5
64	2 5/8	185,0	124,3	148.374	660	67,3	594	60,6
72	2 15/16	234,0	157,2	185.467	825	84,1	743	75,7
80	3 3/16	290,0	194,9	226.832	1.009	102,9	908	92,6
88	3 7/16	351,0	235,9	273.143	1.215	123,9	1.094	111,5
96	3 3/4	417,0	280,2	321.702	1.431	145,9	1.288	131,3

Diameter, weight and MBF (as well as other mechanical and physical properties) are determined according ISO 2307:2010. The MBF refers to the breaking strength of the rope without splices or any other form of termination that can be formed with or without the use of accessories / fittings.

ELONGATION:

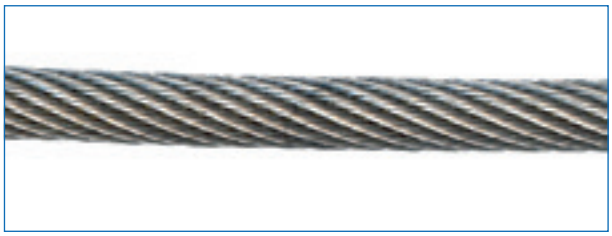


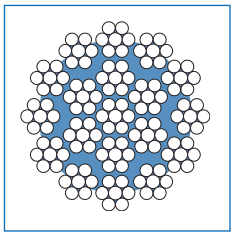
LANKHORST

STEEL WIRE ROPES

On cruise vessels, the majority of steel wire ropes are used to lower lifeboats - a very important application. They have to perform, no matter what. We carry three type of wire suitable for lifeboats: the 19 x 7 rotating resistant and the two non-rotating multi-stranded wires ropes: LANKO®FLEX and LANKO®PACK. Our controlled production process, and the materials used, ensure they are the highest quality steel wire ropes available. The levels of galvanization and internal / external lubrication used on these wires protects them against the harshest environmental conditions at sea. Moreover, the compacting process applied to LANKO®PACK wire rope adds to its breaking strength, providing an even higher guarantee of performance for this type of mission critical application.

19X7





Galva-nized | Greased | RHRL

1960 | No Swivel

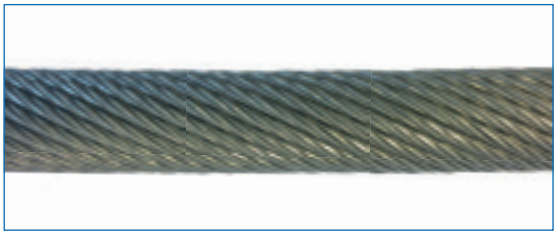
Optional

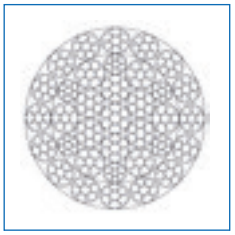
RHLL | LHRL | LHLL

nominal diameter		weight		minimum breaking force IS02408			ferrule-secured	
mm	inch	kg/100m	lb/100ft	lbs	kN	t(metric)	kN	t(metric)
4	5/8	6,3	4,2	2.316	10	1,0	9	0,9
5	3/16	9,7	6,5	3.619	16	1,6	14	1,5
6	1/4	13,9	9,3	5.193	23	2,4	21	2,1
7	13/16	18,8	12,6	7.081	32	3,2	28	2,9
8	5/16	25,0	16,8	9.240	41	4,2	37	3,8
9	1	32,3	21,7	11.713	52	5,3	47	4,8
10	3/8	39,6	26,6	14.455	64	6,6	58	5,9
11	3/7	48,3	32,5	17.490	78	7,9	70	7,1
12	1/2	56,6	38,0	20.817	93	9,4	83	8,5
13	4/8	66,0	44,4	24.504	109	11,1	98	10,0
14	9/16	75,0	50,4	28.326	126	12,8	113	11,6
15	6/10	88,7	59,6	32.597	145	14,8	131	13,3
16	5/8	102,0	68,5	37.093	165	16,8	149	15,1
18	3/4	129,0	86,7	46.760	208	21,2	187	19,1
19	6/8	145,0	97,4	52.156	232	23,6	209	21,3
20	13/16	159,0	106,8	57.776	257	26,2	231	23,6
22	7/8	193,0	129,7	69.916	311	31,7	280	28,5
24	1	227,0	152,5	83.179	370	37,7	333	33,9

Diameter, weight and MBF (as well as other mechanical and physical properties) are determined according ISO 2408 and EN 12385-4. The MBF refers to the breaking strength of the rope without splices or any other form of termination that can be formed with or without the use of accessories / fittings.

LANKO®FLEX





Galva-nized | Greased | 1960 N/mm² | RHLL | Swivel

Optional

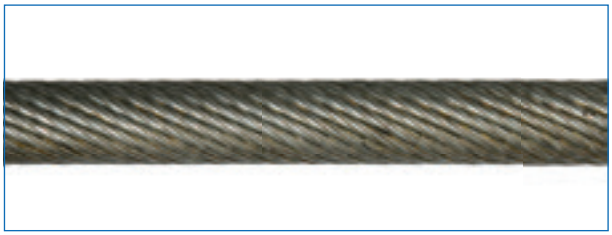
RHRL | LHRL | LHLL

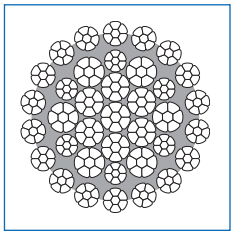
nominal diameter		weight		minimum breaking force ISO2408			minimum breaking force ferrule-secured	
mm	inch	kg/100m	lb/100ft	lbs	kN	t(metric)	kN	t(metric)
8	5/16	27,0	18,7	10.858	50,1	4,9	43	4,4
10*	3/8	42,0	28,2	17.130	76,2	7,8	69	7,0
12	1/2	61,0	41,0	23.470	104,4	11	94	9,6
13	4/8	75,6	50,8	27.427	122	12	110	11,2
14	9/16	85,9	57,7	33.272	148	15,1	133	13,6
15	6/10	98,5	66,2	38.218	170	17,3	153	15,6
16	5/8	111,0	74,6	43.388	193	19,7	174	17,7
18	3/4	143,0	96,1	54.853	244	24,9	220	22,4
19	6/8	157,0	105,5	61.148	272	27,7	245	25,0
20	13/16	174,0	116,9	67.892	302	30,8	272	27,7
22	7/8	213,0	143,1	82.055	365	37,2	329	33,5
24	1	254,0	170,7	97.792	435	44,3	392	39,9
26	1 1/16	299,0	200,9	114.653	510	52,0	459	46,8
28	1 1/8	343,0	230,5	133.087	592	60,3	533	54,3
30	1 1/4	394,0	264,8	152.645	679	69	611	62,3
32	1 5/16	445,0	299,0	173.777	773	78,8	696	70,9
34	1 3/8	505,0	339,3	196.033	872	88,9	785	80,0
36	1 1/2	573,0	385,0	219.863	978	99,7	880	89,7
38	1 9/16	634,0	426,0	245.042	1.090	111,1	981	100,0
40	1 5/8	696,0	467,7	272.019	1.210	123,3	1.089	111,0

Diameter, weight and MBF (as well as other mechanical and physical properties) are determined according ISO 2307. The MBF refers to the breaking strength of the rope without splices or any other form of termination that can be formed with or without the use of accessories / fittings.

* tensile strength: 2060 N/mm2

LANKO®PACK





Galva-nized | Greased | RHLL

2160 N/mm² | Compact | Swivel

Optional

RHRL | LHRL | LHLL | Plastic Coated Core

nominal diameter		weight		minimum breaking force ISO2408			minimum breaking force ferrule-secured	
mm	inch	kg/100m	lb/100ft	lbs	kN	t(metric)	kN	t(metric)
10	3/8	48,0	32,3	21.784	97	9,9	87	8,9
12	1/2	68,0	45,7	30.866	137	14,0	124	12,6
13	4/8	82,0	55,1	37.251	166	17	149	15,2
14	9/16	95,0	63,8	43.276	193	20	173	17,7
15	6/10	109,0	73,2	49.593	221	22,5	199	20,2
16	5/8	125,0	84,0	56.517	251	25,6	226	23,1
18	3/4	157,0	105,5	71.422	318	32,4	286	29,1
19	6/8	176,0	118,3	80.009	356	36,3	320	32,7
20	13/16	194,0	130,4	88.350	393	40,1	354	36,1
22	7/8	234,0	157,2	106.717	475	48,4	427	43,6
24	1	279,0	187,5	127.557	567	57,8	511	52,1
25	63/64	304,0	204,3	138.617	617	62,9	555	56,6
26	1 1/16	327,0	219,7	148.621	666	67,4	595	60,7
28	1 1/8	380,0	255,3	173.305	771	78,6	694	70,7
30	1 1/4	439,0	295,0	199.810	889	91	800	81,5
32	1 5/16	498,0	334,6	226.562	1.008	102,7	907	92,5
34	1 3/8	559,0	375,6	254.708	1.133	115,5	1.020	103,9
36	1 1/2	631,0	424,0	288.385	1.283	130,8	1.155	117,7
38	1 9/16	701,0	471,1	318.869	1.418	144,6	1.277	130,1
40	1 5/8	774,0	520,1	352.725	1.569	159,9	1.412	143,9

larger diameters on request

Diameter, weight and MBF (as well as other mechanical and physical properties) are determined according ISO 2307. The MBF refers to the breaking strength of the rope without splices or any other form of termination that can be formed with or without the use of accessories / fittings.

RELATED ACCESSORIES

Full range available

CLOSED SPELTER SOCKET

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Galvanised steel mooring link of compact design typically utilized as connection between wire rope and fibre tail. Available in five sizes: 90 T, 120 T, 180 T, 250 T and 300 T

PROTECTION SLEEVES

If the rope is affected by rough surfaces or sharp edges, it can be easily damaged. Also in case of high abrasion resistance, high cut-resistance and high chemical resistance protection of the rope is needed. Lankhorst Ropes provide innovative high performance protection solutions to prevent loss of strength and maximize the life of the fi bre rope. Please consult our sales departments for the optimal sleeve to use in your application.

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