SPECIAL WIRE ROPES
THE ADVANCED LINE

OLIVEIRA

A WireCo® WorldGroup Brand

INTRODUCTION

WireCo® WorldGroup

Quality Products, Outstanding Service and Comprehensive Technical Support – It's what today's industries expect from their supplier partners. And that's what WireCo WorldGroup is all about.

WireCo WorldGroup is the global market, manufacturing and technical leader in wire and synthetic rope manufacturing, providing a consultative approach to offer customers a single, reliable source for performance matched solutions to fit their specific application and budget needs. But it doesn't stop there. WireCo WorldGroup offers clients the education and expertise needed to enhance product performance and value.

With our comprehensive range of trusted, global brands we deliver unmatched technical expertise and innovation as well as unparalleled quality assurance meeting and exceeding international quality certifications.

WireCo WorldGroup is on the ground everywhere you are - with manufacturing and distribution facilities all around the world and more than 4,500 global employees supporting these efforts. Our customers enjoy global availability for a consistent, responsive supply no matter where and when they need it.

OLIVEIRA

Already in the 6th generation Oliveira's goal is to provide valuable solutions to our customers. Our products meet the international standards and offer an excellent value to your application.

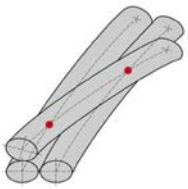
CONTENTS

GENERAL DEFINITIONS

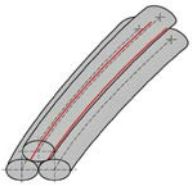
PARALLEL LAY ROPES

Parallel Construction

In a non parallel lay rope all wires and strands have different lay length. The high stress concentration at the crossover point leads to an early internal failure. In a parallel lay rope all wires and strands have the same lay length. The linear contact leads to an optimal stress distribution. Furthermore the compacted parallel design leads to a higher fill factor and breaking strength.



cross lay (non-parallel) stress concentration



parallel lay stress distribution

PPI - PLASTIC PROTECTED IMPREGNATION

PPI

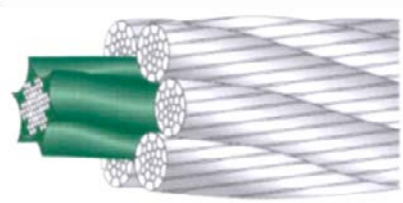
In consequence of being not only a steel wire rope producer but also a synthetic rope manufacturer, Oliveira has a strong and deep know-how of plastic and its applications. The PPI operation is applied during the Oliveira process in one continuous operation which guarantees a perfect impregnation and equal stress and tension of all the components. Resulting the plastic forms only small braces between the strands so they can keep their flexibility to give in to the relative movements within the rope.

Positive effects:

- Allows a homogeneous stress distribution in the rope
- Improves the structural stability
- Encapsulates the lubricant in the core
- Protects the core from corrosion

Resulting in:

- A longer service life
- Keeping its non rotational properties in the most severe conditions
- Internal rope protection against corrosive environment
- Favouring outer maintenance



SWIVEL USE


Swivel

Rotation resistant ropes can be used with a swivel.
All other rope constructions may not be used with a swivel!

ISO 21669 – General guidance on swivel use (rotation-resistance)

- Less than or equal to 1 turn/1000d lifting a load equivalent to 20%MBF, a swivel can be used
- Greater than 1 turn but no greater than 4 turns/1000d – a swivel may be used subject to the recommendations of the rope manufacturer and/or approval of a competent person
- Greater than 4 turns/1000d – a swivel should not be used

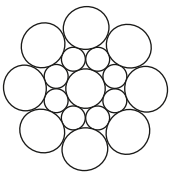

No Swivel

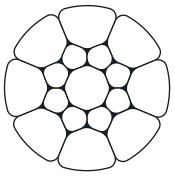
COMPACTING

Compacted

OLIVEIRA is using the most improved and updated technology in the world (multiroll system) for compacting the strands, resulting in:

- Perfect control of the calibration and of the cross section
- No outer surface wearing and injuring
- No peel-off of the zinc coating
- No damage of the inner wires, thanks to the gradual lamination
- All these properties lead the ropes to the highest performance and resistance to fatigue, when compared with the other usual compacting technologies.


conventional strand


compacted strand

LUBRICATED


Lubricated

As a standard feature, Oliveira special wire ropes receive intensive lubrication during the production process. This in-process treatment will provide the rope with ample protection against corrosion and it is meant to reduce the friction between the elements which make up the rope as well as the friction between rope and sheaves or drums. This lubrication, however, only lasts for a limited time and should be reapplied periodically.

PRODUCTION TOLERANCE

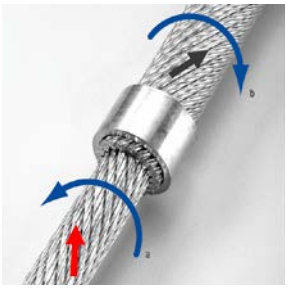
Tolerance

Oliveira special wire ropes are produced within a tolerance range between +0% and +5%. Generally the standard production tolerance is at the upper limit of the tolerance range, between +1% and +4%. For this reason Oliveira special wire ropes fulfill the requirements of the famous drum manufacturers.

GENERAL DEFINITIONS

ROTATION-RESISTANT ROPES

In a conventional rope, an external load creates a moment which tries to untwist the rope. A rotation resistant steel wire rope has a steel core which is an independent rope, closed in the opposite direction to the outer strands. Under load, the core tries to twist the rope in one direction, the outer strands try to twist it in the opposite direction. The geometrical design of a rotation resistant wire rope is such that the moments in the core and the outer strands compensate each other over a wide load spectrum, so that even with great lifting heights practically no rope twist occurs.



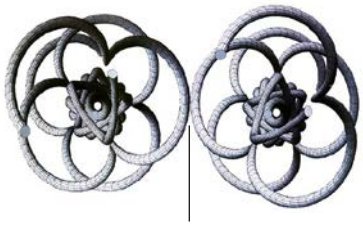
MULTIPLE LAYER SPOOLING

A drum coiling a rope in more than one layer is a multiple layer system with new demands to a wire rope.

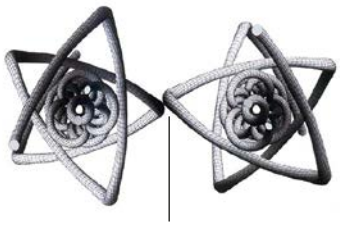
- Low diameter reduction under tension
- Crushing resistance in crossovers and layer crossovers
- Extreme smooth surface for less indentations or pressure in crossovers

The following rope properties are required for a long service life:

- Lang's lay to prevent indentations

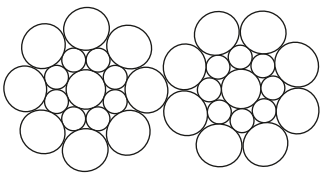


Lang's lay ropes: no indentations of outer wires

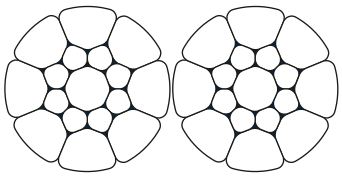


regular lay ropes: indentations of outer wires

- Compacted outer strands to prevent indentations



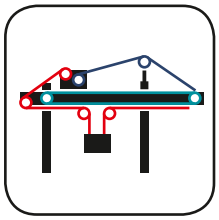
conventional strand



compacted strand

ROPE SELECTION BY APPLICATION

CONTAINER CRANE

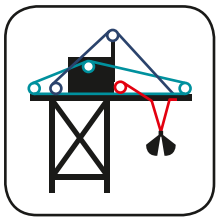


HOIST ROPE
- OLIVEIRA **HD 8 K (Option PPI)**

BOOM HOIST
- OLIVEIRA **HD 8 K (Option PPI)**

TROLLEY
- OLIVEIRA **HD 8 K (Option PPI)**
- OLIVEIRA **SC 8 C (Option PPI)**

SHIP UNLOADER

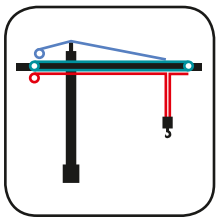


HOIST ROPE
- OLIVEIRA **HD 8 K (Option PPI)**

BOOM HOIST
- OLIVEIRA **HD 8 K (Option PPI)**

TROLLEY
- OLIVEIRA **HD 8 K (Option PPI)**
- OLIVEIRA **SC 8 C (Option PPI)**

TOWER CRANE

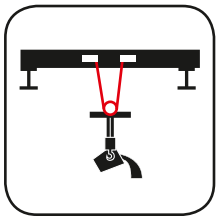


HOIST ROPE
- OLIVEIRA **TOWERLIFT 15**
- OLIVEIRA **LT 24 C**
- OLIVEIRA **LT 24 K**

BOOM PENDANT
- OLIVEIRA **HD 8 K (Option PPI)**

TROLLEY
- OLIVEIRA **SC 8 C (Option PPI)**
- OLIVEIRA **SC 6 K**

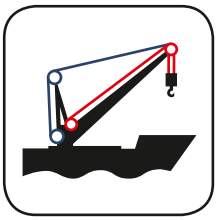
STEELWORKS LADLE



HOIST ROPE
- OLIVEIRA **HD 8 K (Option PPI)**
- OLIVEIRA **SC 8 C (Option PPI)**
- OLIVEIRA **SC 6 K**

Please note: Option PPI if temperature is bellow 115 degrees C on the surface of the rope!

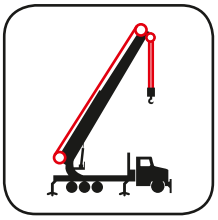
DECK CRANE



HOIST ROPE
- OLIVEIRA **NR MAXIPACT (Option PPI)**
- OLIVEIRA **NR 15 MAXILIFT (Option PPI)**

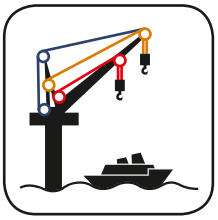
BOOM HOIST
- OLIVEIRA **HD 8 K (Option PPI)**

TELESCOPIC MOBILE CRANE



HOIST ROPE
- OLIVEIRA **NR MAXIPACT (Option PPI)**
- OLIVEIRA **NR 15 MAXILIFT (Option PPI)**

OFFSHORE PEDESTAL CRANE

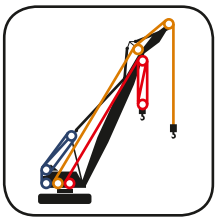


HOIST ROPE
- OLIVEIRA **NR MAXIPACT (Option PPI)**

AUXILIARY HOIST
- OLIVEIRA **NR MAXIPACT (Option PPI)**

BOOM HOIST
- OLIVEIRA **HD 8 K (Option PPI)**

LATTICE BOOM CRAWLER CRANE

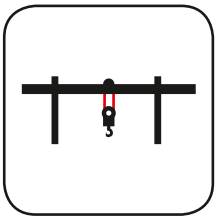


HOIST ROPE
- OLIVEIRA **NR MAXIPACT (Option PPI)**
- OLIVEIRA **NR 15 MAXILIFT (Option PPI)**
- OLIVEIRA **LT 24 K**

BOOM HOIST
- OLIVEIRA **DP 8 K (Option PPI)**
- OLIVEIRA **HD 8 K (Option PPI)**

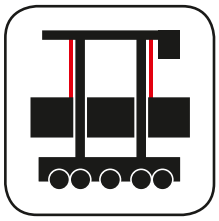
AUXILIARY HOIST
- OLIVEIRA **NR MAXIPACT (Option PPI)**
- OLIVEIRA **NR 15 MAXILIFT (Option PPI)**

RUBBER TIRED GANTRY / RAIL MOUNTED GANTRY



HOIST ROPE
- OLIVEIRA **HD 8 K (Option PPI)**
- OLIVEIRA **DP 8 K (Option PPI)**

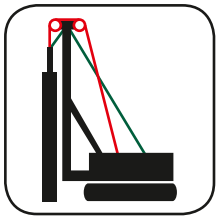
STRADDLE CARRIERS



HOIST ROPE

- OLIVEIRA **HD 8 K (Option PPI)**
- OLIVEIRA **DP 8 K (Option PPI)**

DRILLING / PILING



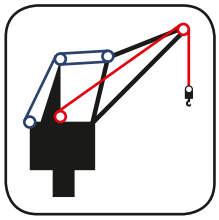
HOIST ROPE

- OLIVEIRA **NR 15 MAXILIFT (Option PPI)**

FEED ROPE

- OLIVEIRA **HD 8 K (Option PPI)**

HARBOR MOBILE CRANE



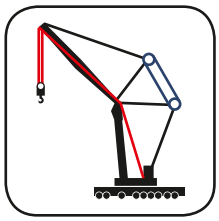
HOIST ROPE

- OLIVEIRA **HD 8 K (Option PPI)**

BOOM HOIST

- OLIVEIRA **HD 8 K (Option PPI)**

LATTICE BOOM MOBILE CRANE



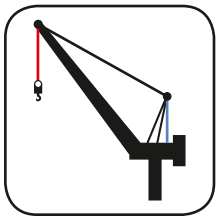
HOIST ROPE

- OLIVEIRA **NR MAXIPACT (Option PPI)**
- OLIVEIRA **NR 15 MAXILIFT (Option PPI)**
- OLIVEIRA **LT 24 K**

BOOM HOIST

- OLIVEIRA **DP 8 K (Option PPI)**
- OLIVEIRA **HD 8 K (Option PPI)**

LUFFING-JIB TOWER CRANE



HOIST ROPE

- OLIVEIRA **NR MAXIPACT (Option PPI)**
- OLIVEIRA **NR 15 MAXILIFT (Option PPI)**

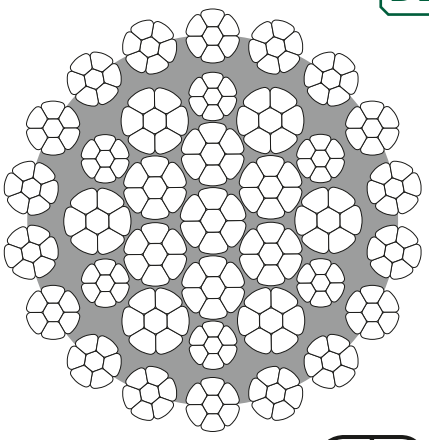
BOOM PENDANT

- OLIVEIRA **HD 8 K (Option PPI)**
- OLIVEIRA **DP 8 K (Option PPI)**

ROTATION-RESISTANT ROPES

- Designed to generate reduced levels of torque and rotation when loaded.
- Designed with at least two layers of strands laid helically around a center.
- The direction of lay of the outer strands being opposite to that of the underlying layer.

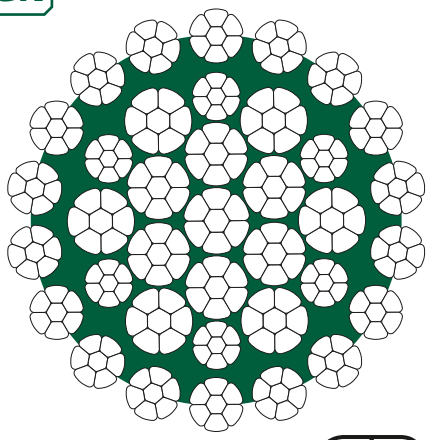
OLIVEIRA NR MAXIPACT



High breaking force

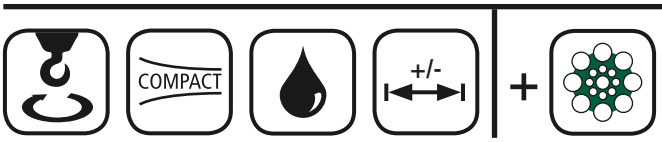
OLIVEIRA NR MAXIPACT PPI

IMPROVED **DESIGN**



High breaking force

PROPERTIES



Swivel | Compacted | Lubricated | Tolerance | PPI

APPLICATIONS

All cranes and performant lifting devices where non-rotating and high MBL ropes are required.

Recommended for offshore, deck cranes and marine environment.

OVERVIEW

RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
23–3	13 – 54	37xK7	18	259	126	0,716	0,85 (1960 N/mm²) 0,81 (2160 N/mm²)

- Temperature range of use: -50°C to +100°C
- Temperature range of use for option PPI: -50°C to +80°C
- Option PPI – only available for diameter ≥ 13mm
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand

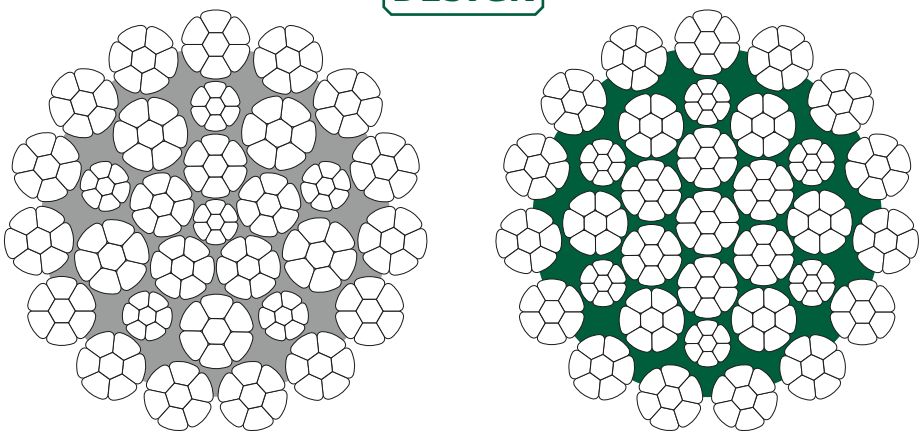
nominal diameter	metallic area	weight	calculated aggregate breaking force				minimum breaking force			
			1960 N/mm²		2160 N/mm²		1960 N/mm²		2160 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]	kN	t [metric]	kN	t [metric]
13	94,7	0,816	185,6	18,9	204,6	20,9	157,8	16,1	165,7	16,9
14	110,0	0,949	215,6	22,0	237,6	24,2	183,3	18,7	192,5	19,6
15	125,8	1,088	246,6	25,1	271,7	27,7	209,6	21,4	220,6	22,5
16	143,7	1,245	281,7	28,7	310,4	31,7	239,4	24,4	251,4	25,6
17	161,9	1,398	317,3	32,4	349,7	35,7	269,7	27,5	283,4	28,9
18	181,6	1,562	355,9	36,3	392,3	40,0	302,5	30,9	317,7	32,4
19	203,4	1,757	398,7	40,7	439,3	44,8	338,9	34,6	355,9	36,3
20	224,6	1,930	440,2	44,9	485,1	49,5	374,2	38,2	393,0	40,1
21	247,4	2,139	484,9	49,4	534,4	54,5	412,2	42,0	432,9	44,1
22	271,3	2,342	531,7	54,2	586,0	59,8	452,0	46,1	474,7	48,4
23	297,0	2,560	582,1	59,4	641,5	65,4	494,8	50,5	519,6	53,0
24	324,3	2,790	635,6	64,8	700,5	71,4	540,3	55,1	567,4	57,9
25	352,4	3,043	690,7	70,4	761,2	77,6	587,1	59,9	616,6	62,9
26	380,7	3,270	746,2	76,1	822,3	83,9	634,2	64,7	666,1	67,9
27	410,3	3,544	804,2	82,0	886,2	90,4	683,6	69,7	717,9	73,2
28	440,6	3,802	863,6	88,1	951,7	97,0	734,0	74,9	770,9	78,6
30	508,0	4,391	995,7	101,5	1097,3	111,9	846,3	86,3	888,8	90,6
32	576,0	4,977	1129,0	115,1	1244,2	126,9	959,6	97,9	1007,8	103
34	647,1	5,586	1268,3	129,3	1397,7	142,5	1079,3	110	1133,0	116
36	733,2	6,314	1437,1	146,5	1583,7	161,5	1221,5	125	1282,8	131
38	810,7	7,014	1589,0	162,0	1751,1	178,6	1352,4	138	1418,4	145
40	896,0	7,744	1756,2	179,1	1935,4	197,4	1495,0	152	1569,0	160
42	987,5	8,519	1935,5	197,4	2133,0	217,5	1645,2	168	1730,0	176
44	1091,6	9,400	2139,5	218,2	2357,9	240,4	1818,6	185	1909,9	195
46	1198	10,374	2347,9	239,4	2587,5	263,8	1995,7	204	2095,8	214
48	1311	11,320	2569,8	262,0	2832,0	288,8	2184,3	223	2293,9	234
50	1400	12,042	2743,2	279,7	3023,1	308,3	2331,7	238	2451,2	250
52	1529,7	13,226	2998,2	305,7	3304,2	336,9	2548,8	260	2676,4	273
54	1639,4	14,128	3213,2	327,7	3541,1	361,1	2731,2	279	2868,3	292

Special constructions and diameters available - please contact us directly.

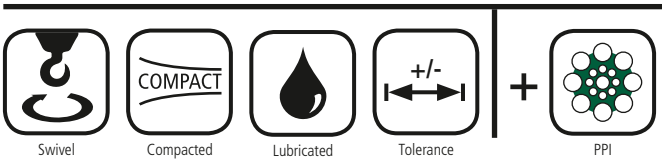
OLIVEIRA NR15 MAXILIFT

OLIVEIRA NR15 MAXILIFT PPI

IMPROVED DESIGN



PROPERTIES



APPLICATIONS

For all the most severe hoist applications, intensive use, corrosive environment... Traditional applications like mobile cranes, tower cranes, crawler cranes.

Offshore cranes, deck cranes, cargo cranes, foundation cranes (Kelly cranes), harbor cranes.

OVERVIEW

RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
23–2	10 – 28	31xK7	15	217	105	0,701	0,85 (1960 N/mm²)
23–2	30 – 50	34xK7	15	238	105	0,705	0,81 (2160 N/mm²)

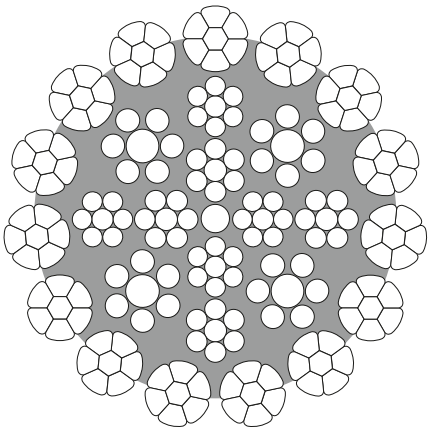
- Temperature range of use: -50°C to +100°C
- Temperature range of use for option PPI: -50°C to +80°C
- Option PPI – only available for diameter ≥ 13mm
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand

nominal diameter	metallic area	weight	calculated aggregate breaking force				minimum breaking force			
			1960 N/mm²		2160 N/mm²		1960 N/mm²		2160 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]	kN	t [metric]	kN	t [metric]
10	55,4	0,480	108,5	11,1	119,6	12,2	92,2	9,4	96,9	9,9
11	65,1	0,563	127,5	13,0	140,5	14,3	108,4	11,1	113,9	11,6
12	78,5	0,683	153,9	15,7	169,6	17,3	130,8	13,3	137,3	14,0
13	91,5	0,793	179,3	18,3	197,6	20,1	152,4	15,5	160,0	16,3
14	107,3	0,929	210,3	21,4	231,8	23,6	178,8	18,2	187,7	19,1
15	123,8	1,075	242,6	24,7	267,4	27,3	206,3	21,0	216,6	22,1
16	140,5	1,219	275,4	28,1	303,5	30,9	234,1	23,9	245,8	25,1
17	159,3	1,383	312,2	31,8	344,1	35,1	265,4	27,1	278,7	28,4
18	179,1	1,553	351,0	35,8	386,9	39,4	298,4	30,4	313,4	32,0
19	197,8	1,718	387,7	39,5	427,2	43,6	329,5	33,6	346,1	35,3
20	222,1	1,909	435,3	44,4	479,7	48,9	370,0	37,7	388,6	39,6
21	243,9	2,107	478,0	48,7	526,8	53,7	406,3	41,4	426,7	43,5
22	267,9	2,315	525,1	53,5	578,7	59,0	446,3	45,5	468,7	47,8
23	292,3	2,519	572,9	58,4	631,4	64,4	487,0	49,7	511,4	52,1
24	319,0	2,757	625,2	63,8	689,0	70,3	531,5	54,2	558,1	56,9
25	345,9	2,988	678,0	69,1	747,1	76,2	576,3	58,8	605,2	61,7
26	374,6	3,229	734,2	74,9	809,1	82,5	624,1	63,6	655,4	66,8
27	401,6	3,468	787,1	80,3	867,5	88,5	669,1	68,2	702,6	71,6
28	432,8	3,737	848,3	86,5	934,8	95,3	721,0	73,5	757,2	77,2
30	497,5	4,299	975,1	99,4	1074,6	110	828,8	84,5	870,4	88,8
32	561,5	4,848	1100,5	112,2	1212,8	124	935,5	95,4	982,4	100,2
34	638,6	5,512	1251,7	127,6	1379,4	141	1063,9	108,5	1117,3	113,9
36	721,8	6,253	1414,7	144,3	1559,1	159	1202,5	122,6	1262,9	128,8
38	798,8	6,909	1565,6	159,7	1725,4	176	1330,8	135,7	1397,6	142,5
40	887,1	7,665	1738,7	177,3	1916,1	195	1477,9	150,7	1552,1	158,3
42	986,9	8,493	1934,3	197,2	2131,7	217	1644,2	167,7	1726,7	176,1
44	1068,1	9,201	2093,5	213,5	2307,1	235	1780,5	181,6	1868,7	190,6
46	1170,1	10,128	2293,4	233,9	2527,4	258	1949,4	198,8	2047,2	208,8
48	1264,3	10,902	2478,0	252,7	2730,9	278	2106,3	214,8	2212,0	225,6
50	1389,5	11,958	2723,4	277,7	3001,3	306	2314,9	236,1	2431,1	247,9

Special constructions and diameters available - please contact us directly.

OLIVEIRA

TOWERLIFT 15



PROPERTIES

APPLICATIONS

The Towerlift 15 can be used for all cranes and hoisting systems where non-rotating properties are required: Tower cranes, mobile cranes, crawler cranes, offshore cranes, cargo cranes...

OVERVIEW

RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
23–2	8 – 21	27x7	15	190	105	0,648	0,850 (1960 N/mm²)
23–2	22 – 50	31x7	15	217	105	0,660	0,81 (2160 N/mm²)

- Temperature range of use: -50°C to +100°C
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand

nominal diameter	metallic area	weight	calculated aggregate breaking force				minimum breaking force			
			1960 N/mm²		2160 N/mm²		1960 N/mm²		2160 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]	kN	t [metric]	kN	t [metric]
8	30,6	0,26			66,0	6,73			53,5	5,46
9	38,6	0,33			83,4	8,50			67,5	6,88
10	50,2	0,43	98,4	10,03	108,4	11,06	83,7	8,54	87,8	8,95
11	60,8	0,52	119,2	12,15	131,3	13,39	101,5	10,35	106,4	10,85
12	72,4	0,62	141,9	14,47	156,4	15,95	120,8	12,32	126,6	12,91
13	85,3	0,74	167,2	17,05	184,2	18,79	142,4	14,52	149,3	15,22
14	98,7	0,85	193,5	19,73	213,2	21,74	164,7	16,79	172,7	17,61
15	115,9	1,00	227,2	23,16	250,3	25,53	193,4	19,72	202,8	20,68
16	131,0	1,13	256,8	26,18	283,0	28,85	218,9	22,32	229,6	23,41
17	148,5	1,28	291,1	29,68	320,8	32,71	247,7	25,26	259,8	26,49
18	166,4	1,43	326,1	33,26	359,4	36,65	277,4	28,29	290,9	29,66
19	186,5	1,60	365,5	37,27	402,8	41,08	310,2	31,63	325,4	33,18
20	204,2	1,76	400,2	40,81	441,1	44,98	339,6	34,63	356,2	36,32
21	226,8	1,96	444,5	45,33	489,9	49,95	377,2	38,46	395,6	40,34
22	253,3	2,18	496,5	50,63	547,1	55,79	421,4	42,97	441,9	45,06
23	276,6	2,38	542,1	55,28	597,5	60,92	459,8	46,89	482,2	49,17
24	299,5	2,58	587,0	59,86	646,9	65,97	496,9	50,67	521,2	53,15
25	324,9	2,80	636,8	64,94	701,8	71,56	540,9	55,16	567,2	57,84
26	346,8	2,99	679,7	69,31	749,1	76,39	578,0	58,94	606,2	61,82
27	381,3	3,29	747,3	76,21	823,6	83,98	634,6	64,71	665,5	67,86
28	411,6	3,55	806,7	82,26	889,1	90,66	684,6	69,81	717,9	73,21
30	468,8	4,05	918,8	93,70	1012,6	103,26	782,1	79,75	820,3	83,65
32	526,1	4,54	1031,2	105,15	1136,4	115,88	877,8	89,51	920,6	93,88
34	603,7	5,21	1183,3	120,66	1304,0	132,97	1009,3	102,92	1058,5	107,94
36	672,1	5,82	1317,3	134,33	1451,7	148,04	1124,9	114,71	1179,8	120,31
38	741,5	6,40	1453,3	148,20	1601,6	163,32	1240,9	126,54	1301,4	132,71
40	828,1	7,14	1623,1	165,51	1788,7	182,40	1371,3	139,83	1438,2	146,66
42	910,4	7,83	1784,4	181,96	1966,5	200,52	1503,9	153,36	1577,2	160,83
43	961,2	8,29	1884,0	192,11	2076,2	211,71	1611,8	164,36	1690,3	172,36
44	1004,0	8,64	1967,8	200,66	2168,6	221,14	1678,0	171,11	1759,8	179,45
45	1055,7	9,09	2069,2	211,00	2280,3	232,53	1749,4	178,39	1834,6	187,08
46	1097,4	9,47	2150,9	219,33	2370,4	241,71	1820,3	185,62	1909,0	194,66
48	1194,8	10,28	2341,8	238,80	2580,8	263,17	1985,4	202,45	2082,2	212,33
50	1307,1	11,22	2561,9	261,24	2823,3	287,90	2176,9	221,98	2283,0	232,80

Special constructions and diameters available - please contact us directly.

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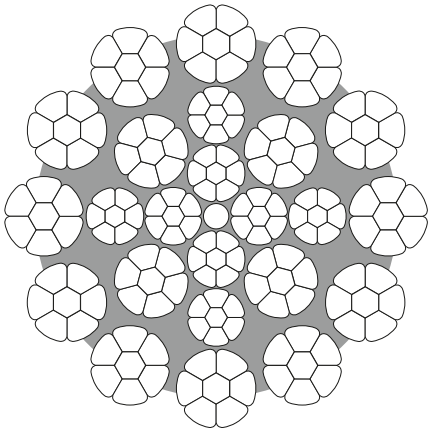
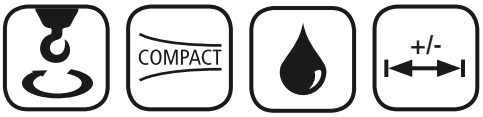
LT 24 K



PROPERTIES



APPLICATIONS

Recommended for intensive use and severe hoist applications where rotation resistance property is required like e.g. tower cranes. For lifting applications with not less than 2 falls.

OVERVIEW

RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
23–1	7,2 - 20	24xK7	12	169	84	0,683	0,840 (1960 N/mm²)
25	21 - 48	24xK17	12	289	204	0,694	

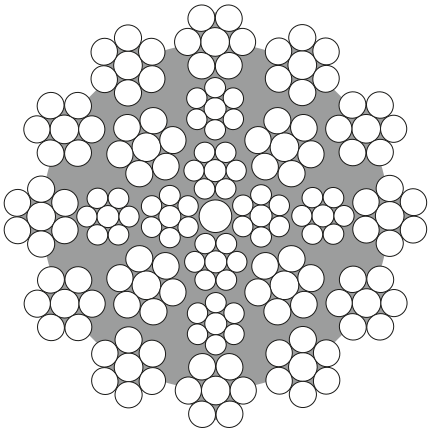
- Temperature range of use: -50°C to +100°C
- Available in Lang's lay
- Available in right hand and left hand

nominal diameter	metallic area	weight	calculated aggregate breaking force		minimum breaking force	
			1960 N/mm²		1960 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]
7,2	26,6	0,229	52,2	5,32	43,7	4,46
8	32,3	0,280	63,4	6,47	55,1	5,62
9	41,1	0,356	80,6	8,21	69,6	7,10
10	53,5	0,464	105	10,7	88,2	8,99
11	64,8	0,560	127	13,0	108	11,0
12	77,5	0,669	152	15,5	128	13,1
12,7	86,3	0,748	169	17,2	142	14,5
13	89,6	0,779	176	17,9	149	15,2
14	104	0,907	205	20,9	174	17,8
15	121	1,054	237	24,1	198	20,2
16	139	1,204	272	27,7	230	23,4
17	154	1,336	302	30,8	256	26,1
18	173	1,508	340	34,7	294	30,0
19	195	1,694	382	39,0	324	33,0
20	217	1,883	425	43,3	354	36,1
21	241	2,100	473	48,2	402	40,99
22	263	2,284	515	52,5	433	44,12
24	317	2,751	622	63,4	526	53,66
26	370	3,203	724	73,9	610	62,20
28	427	3,713	837	85,3	706	72,0
30	490,1	4,243	961	97,9	808	82,4
32	551,2	4,801	1080	110	935	95,3
34	629,5	5,478	1234	126	1047	107
35	665	5,783	1303	133	1109	113
36	705	6,133	1381	141	1165	119
38	779	6,778	1528	156	1295	132
40	879	7,643	1722	176	1429	146
41	921	8,038	1805	184	1498	153
42	967	8,367	1895	193	1573	160
44	1053	9,173	2065	211	1714	175
46	1144	9,951	2243	229	1862	190
48	1263	10,94	2475	252	2055	210

Special constructions and diameters available - please contact us directly.

OLIVEIRA

LT 24 C



PROPERTIES

APPLICATIONS

All lifting applications when MBL is not critical, and when rotation resistant properties only are required. For lifting applications with not less than 2 falls.

OVERVIEW

RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
23–1	7,2 – 24	24x7	12	169	84	0,629	0,830 (1960 N/mm²) 0,810 (2160 N/mm²)

- Temperature range of use: -50°C to +100°C
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand

nominal diameter	metallic area	weight	calculated aggregate breaking force				minimum breaking force			
			1960 N/mm²		2160 N/mm²		1960 N/mm²		2160 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]	kN	t [metric]	kN	t [metric]
7,2	24,3	0,209	47,6	4,86	52,5	5,35	39,5	4,03	42,5	4,34
8	30,8	0,266	60,3	6,15	66,5	6,78	50,1	5,11	53,9	5,49
9	38,5	0,333	75,5	7,70	83,2	8,49	62,7	6,39	67,4	6,87
10	50,0	0,433	97,9	9,99	108	11,0	80,5	8,21	87,4	8,91
11	60,7	0,527	119	12,1	131	13,4	98,8	10,1	106	10,8
12	71,2	0,614	140	14,2	154	15,7	116	11,8	125	12,7
13	83,8	0,727	164	16,8	181	18,5	136	13,9	147	15,0
14	95,6	0,829	187	19,1	206	21,1	156	15,9	167	17,1
15	111	0,956	217	22,1	239	24,4	180	18,4	194	19,7
16	127	1,105	250	25,5	275	28,1	207	21,1	223	22,7
17	143	1,235	279	28,5	308	31,4	232	23,7	249	25,4
18	160	1,385	313	31,9	345	35,2	260	26,5	279	28,5
19	180	1,561	353	36,0	389	39,7	293	29,9	315	32,2
20	198	1,715	388	39,6	428	43,6	322	32,9	347	35,4
22	237	2,060	465	47,4	513	52,3	386	39,4	415	42,3
24	283	2,449	554	56,5	611	62,3	460	46,9	495	50,5

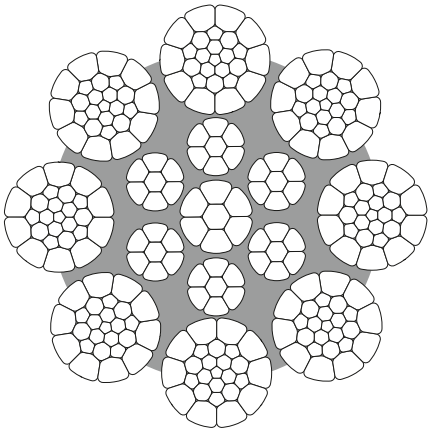
Special constructions and diameters available - please contact us directly.


M0211
45'

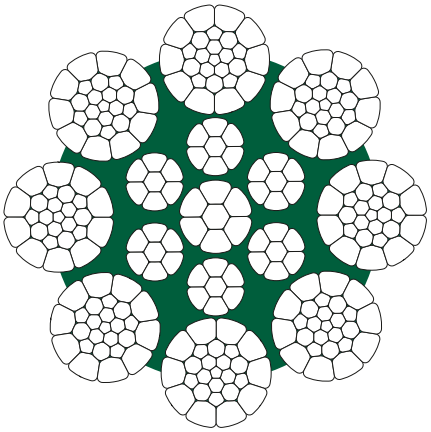
NON-ROTATION-RESISTANT ROPES

- Generate high levels of torque and rotation when loaded. Due to that the non-rotation-resistant ropes (Rotational) must not be used with a swivel.
- Designed with at least two layers of strands laid helically around a center.
- The direction of lay of the outer strands being same to that of the underlying layer.

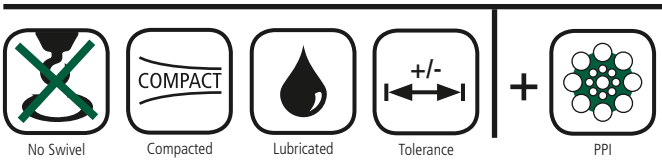
OLIVEIRA **HD 8 K**



OLIVEIRA **HD 8 K PPI**



PROPERTIES



APPLICATIONS

When rotation resistant ropes are not required (twin hoist systems with right and left ropes, small heights). Hoist for steel mill cranes, container cranes, floating cranes and boom hoist for deck cranes, luffing and mobile cranes, grab cranes

OVERVIEW

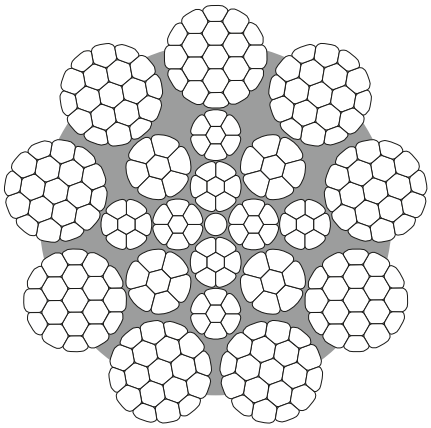
RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
03	8 – 11	8xK12	8	145	96	0,663	0,850 (1960 N/mm²) 0,810 (2160 N/mm²)
03	12 – 15	8xK17	8	185	136	0,669	
09	16 – 28	8xK26	8	257	208	0,666	
11	30 – 42	8xK31	8	297	248	0,670	
13	44 – 60	8xK36	8	407	288	0,682	

- Temperature range of use: -50°C to +100°C
- Temperature range of use for option PPI: -50°C to +80°C
- Option PPI – only available for diameter ≥ 13mm
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand

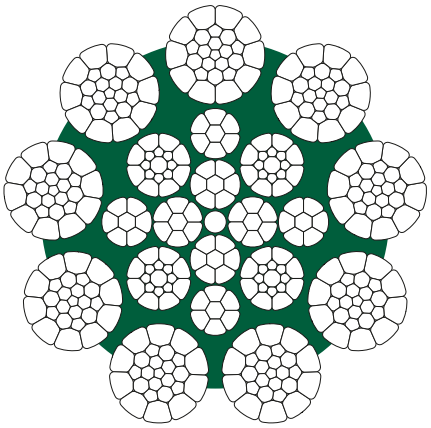
nominal diameter	metallic area	weight	calculated aggregate breaking force				minimum breaking force			
			1960 N/mm²		2160 N/mm²		1960 N/mm²		2160 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]	kN	t [metric]	kN	t [metric]
8	32,9	0,284			71,2	7,26			58,0	5,91
9	42,2	0,362			91,1	9,29			73,6	7,50
10	53,3	0,458			115	11,7			92,4	9,4
11	64,3	0,553			139	14,2			112	11,4
12	75,8	0,649	148	15,1	164	16,7	126	12,9	133	13,5
13	89,3	0,769	175	17,8	193	19,7	149	15,2	156	15,9
14	104	0,896	203	20,7	224	22,9	173	17,7	182	18,5
15	121	1,034	236	24,1	260	26,6	201	20,5	211	21,5
16	133	1,148	260	26,5	286	29,2	221	22,6	232	23,7
18	171	1,479	335	34,2	369	37,6	285	29,1	299	30,5
19	188	1,632	369	37,7	407	41,5	314	32,1	330	33,6
20	212	1,838	416	42,5	459	46,8	354	36,1	372	37,9
22	251	2,173	492	50,2	542	55,3	419	42,7	439	44,8
24	305	2,548	599	61,1	660	67,3	510	52,0	535	54,5
26	353	3,054	692	70,5	762	77,7	589	60,0	618	63,0
28	411	3,554	806	82,2	888	90,5	686	69,9	719	73,3
30	476	4,128	933	95,2	1029	105	794	81,0	833	85,0
32	543	4,694	1063	108	1172	120	905	92,3	949	96,8
34	610	5,261	1196	122	1318	134	1018	104	1067	109
36	688	5,969	1349	138	1487	152	1148	117	1204	123
38	762	6,612	1493	152	1645	168	1271	130	1332	136
40	845	7,298	1656	169	1825	186	1410	144	1479	151
41	878	7,579	1720	175	1896	193	1464	149	1536	157
42	922	7,978	1807	184	1992	203	1538	157	1613	165
44	1040	9,001	2039	208	2247	229	1736	177	1820	186
46	1129	9,780	2212	226	2438	249	1883	192	1975	201
48	1232	10,66	2415	246	2661	271	2055	210	2155	220
50	1350	11,69	2647	270	2917	297	2253	230	2363	241
52	1455	12,59	2851	291	3142	320	2427	247	2545	260
54	1563	13,54	3063	312	3375	344	2607	266	2734	279
56	1681	14,59	3295	336	3632	370	2805	286	2942	300
58	1811	15,69	3549	362	3911	399	3021	308	3168	323
60	1932	16,71	3788	386	4174	426	3224	329	3381	345

Special constructions and diameters available - please contact us directly.

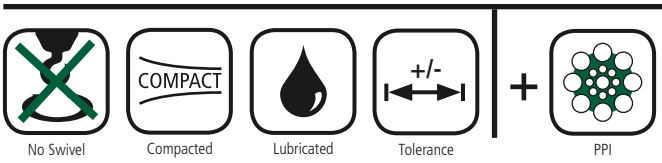
OLIVEIRA **HD 9 K**



OLIVEIRA **HD 9 K PPI**



PROPERTIES



No Swivel | Compacted | Lubricated | Tolerance | PPI

APPLICATIONS

Boom hoist for deck cranes, luffing for mobile and crawler, electric hoists , trolley for container cranes.

Recommended for all marine and offshore applications and all the most severe working environmental conditions.

OVERVIEW

RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
06	9 – 12	9xK16*	9	193	144	0,668	
07	13 – 19	9xK19*	9	256	171	0,683	0,830 (1960 N/mm²)
10	20 – 28	9xK26	9	359	234	0,684	0,810 (2160 N/mm²)
12	30 – 38	9xK31	9	404	279	0,691	

- Temperature range of use: -50°C to +100°C
- Temperature range of use for option PPI: -50°C to +80°C
- Option PPI – only available for diameter ≥ 13mm
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand

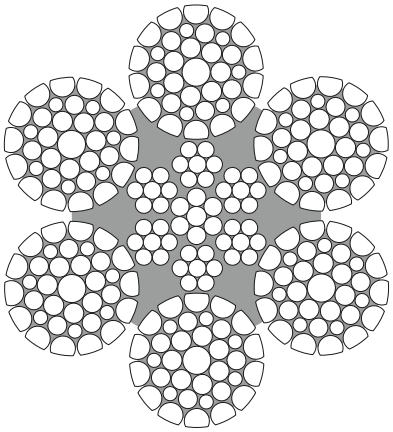
*The core strands are closed in the opposite lay than the outer strands, leading the HD 9 K (PPI) to have a reduced torque (lower than 6 or 8 strands ropes in generally) for a better stability of the sheave block.

nominal diameter	metallic area	weight	calculated aggregate breaking force				minimum breaking force			
			1960 N/mm²		2160 N/mm²		1960 N/mm²		2160 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]	kN	t [metric]	kN	t [metric]
9	42,9	0,373	84,2	8,58	92,8	9,46	69,5	7,09	74,9	7,64
10	52,9	0,459	104	10,6	114	11,7	86,0	8,77	92,2	9,40
11	63,9	0,554	125	12,8	138	14,1	104	10,6	111	11,4
12	75,4	0,650	148	15,1	163	16,6	122	12,5	132	13,4
13	91,2	0,790	179	18,2	197	20,1	148	15,1	159	16,2
14	104	0,899	203	20,7	224	22,9	168	17,2	181	18,5
15	122	1,052	239	24,3	263	26,8	198	20,1	213	21,7
16	137	1,188	269	27,4	297	30,2	223	22,7	240	24,5
18	172	1,491	338	34,5	372	38,0	280	28,6	301	30,7
19	196	1,698	384	39,2	424	43,2	318	32,4	343	35,0
20	214	1,856	420	42,8	463	47,2	349	35,6	375	38,2
22	260	2,249	509	51,9	561	57,2	423	43,1	455	46,4
24	310	2,688	608	62,0	671	68,4	505	51,5	543	55,4
25	336	2,907	658	67,1	725	74,0	546	55,7	587	59,9
26	364	3,163	714	72,8	787	80,3	593	60,4	638	65,0
28	420	3,642	823	83,9	906	92,4	683	69,6	734	74,9
30	484	4,207	950	96,8	1046	107	807	82,3	848	86,4
32	558	4,826	1093	111	1204	123	929	94,7	975	99,5
34	630	5,472	1235	126	1361	139	1050	107	1102	112
35	662	5,730	1298	132	1430	146	1103	113	1159	118
36	704	6,118	1380	141	1521	155	1173	120	1232	126
38	784	6,791	1537	157	1694	173	1307	133	1372	140

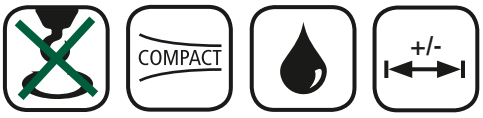
Special constructions and diameters available - please contact us directly.

OLIVEIRA

SC 6 K



PROPERTIES



No Swivel | Compacted | Lubricated | Tolerance

APPLICATIONS

Can be used for all hoist and pulling applications when a higher MBL instead of 6 strands conventional ropes is required. Manufacturing of slings with a high MBL.
Mainly used for logging (forest industry).

OVERVIEW

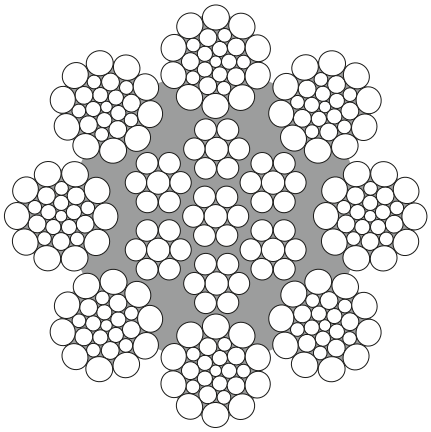
RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
02	10 – 13	6xK19	6	163	114	0,666	0,860 (1960 N/mm²)
06	14 – 19	6xK26	6	205	156	0,663	0,840 (1960 N/mm²)
08	20 – 29	6xK31	6	235	186	0,675	
09	30 – 52	6xK36	6	265	216	0,675	

- Temperature range of use: -50°C to +100°C
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand

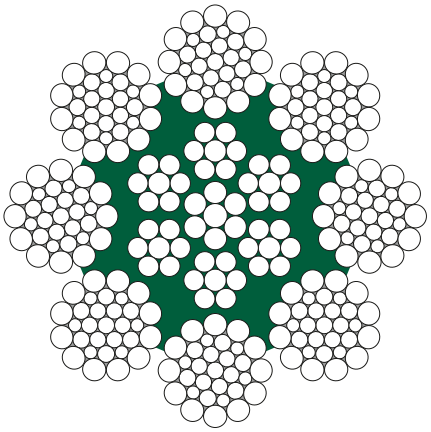
nominal diameter	metallic area	weight	calculated aggregate breaking force		minimum breaking force	
			1960 N/mm²		1960 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]
10	51,9	0,444	102	10,4	87,7	8,94
11	63,9	0,544	125	12,8	107	10,9
12	74,5	0,636	146	14,9	126	12,8
13	88,9	0,763	174	17,8	150	15,3
14	103	0,874	201	20,5	169	17,3
15	116	0,985	227	23,1	191	19,5
16	133	1,129	260	26,5	219	22,3
17	152	1,289	298	30,4	251	25,5
18	168	1,428	329	33,5	277	28,2
19	189	1,604	370	37,7	311	31,7
20	209	1,781	410	41,8	345	35,2
22	255	2,163	500	51,0	419	42,7
24	308	2,614	603	61,5	504	51,4
25	329	2,796	645	65,8	543	55,3
26	365	3,087	715	72,9	598	61,0
28	413	3,525	810	82,6	682	69,5
29	448	3,807	877	89,5	738	75,2
30	477	4,053	935	95,4	787	80,2
32	540	4,606	1059	108,0	891	90,8
34	614	5,222	1203	122,7	1012	103,2
35	653	5,559	1280	130,5	1076	109,8
36	687	5,847	1346	137,2	1132	115,4
38	765	6,349	1499	152,9	1261	128,6
40	850	7,233	1667	170,0	1402	142,9
42	928	7,913	1819	185,5	1530	156,0
44	1032	8,800	2023	206,3	1702	173,5
46	1121	9,546	2197	224,0	1847	188,4
48	1221	10,40	2393	244,0	2012	205,2
50	1322	11,27	2591	264,2	2179	222,2
52	1434	12,24	2811	286,6	2364	241,1

Special constructions and diameters available - please contact us directly.

OLIVEIRA **SC 8 C**



OLIVEIRA **SC 8 C PPI**



PROPERTIES

APPLICATIONS

Can be used for all applications as the HD 8 K PPI when a very high MBL is not required.
Can be used for flexible slings.

OVERVIEW

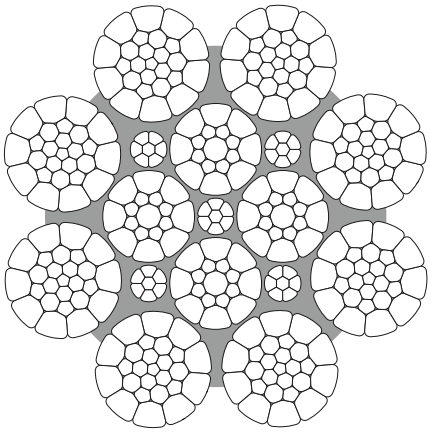
RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
03	8 – 15	8x17	8	185	136	0,618	0,830 (1960 N/mm²)
09	16 – 28	8x26	8	257	208	0,634	
11	30 – 44	8x31	8	297	248	0,633	
13	46 – 62	8x36	8	421	288	0,651	

- Temperature range of use: -50°C to +100°C
- Temperature range of use for option PPI: -50°C to +80°C
- Option PPI – only available for diameter ≥ 13mm
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand

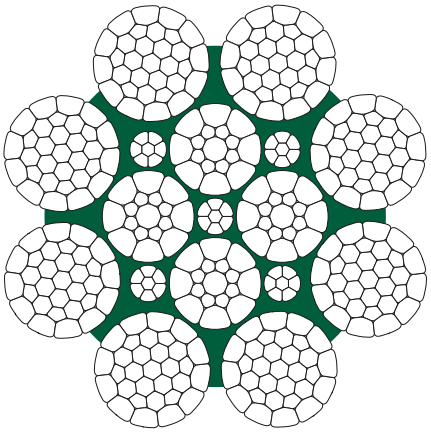
nominal diameter	metallic area	weight	calculated aggregate breaking force		minimum breaking force	
			1960 N/mm²		1960 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]
8	30,5	0,262	59,8	6,10	49,7	5,06
9	38,9	0,334	76,2	7,77	63,3	6,45
10	48,0	0,412	94,1	9,60	78,1	7,97
11	58,6	0,503	115	11,7	95,4	9,72
12	70,5	0,604	138	14,1	115	11,7
13	82,5	0,711	162	16,5	134	13,7
14	96,4	0,830	189	19,3	157	16,0
15	111	0,950	217	22,1	180	18,3
16	129	1,107	252	25,7	209	21,3
18	161	1,386	316	32,2	262	26,8
19	178	1,531	349	35,5	289	29,5
20	199	1,720	391	39,9	325	33,1
22	240	2,066	471	48,1	391	39,9
24	288	2,466	565	57,6	469	47,8
26	332	2,860	652	66,5	541	55,2
28	391	3,369	767	78,2	637	64,9
30	450	3,868	883	90,0	733	74,7
32	506	4,350	993	101	824	84,0
34	569	4,901	1115	114	925	94,4
35	620	5,335	1215	124	1008	103
36	646	5,553	1267	129	1052	107
38	721	6,205	1413	144	1173	120
40	794	6,829	1557	159	1292	132
41	832	7,169	1630	166	1353	138
42	872	7,495	1709	174	1419	145
44	958	8,230	1877	191	1558	159
46	1075	9,260	2107	215	1749	178
48	1183	10,18	2318	236	1924	196
50	1286	11,08	2521	257	2093	213
52	1391	11,97	2726	278	2263	231
54	1500	12,89	2939	300	2440	249
56	1593	13,69	3122	318	2591	264
58	1705	14,65	3342	341	2774	283
60	1828	15,75	3584	365	2975	303
62	1953	16,81	3828	390	3177	324

Special constructions and diameters available - please contact us directly.

OLIVEIRA **DP 8 K**

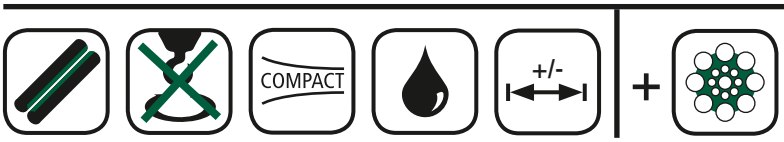


OLIVEIRA **DP 8 K PPI**



High breaking force

PROPERTIES



Parallel Construction | No Swivel | Compacted | Lubricated | Tolerance | PPI

APPLICATIONS

When an extremely high MBL is required for a multipart reeving hoist system: electric hoists, twin hoists systems, boom hoist and pendant rope for mobile cranes, tower cranes and all marine equipments.

OVERVIEW

RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
03	6,4 – 7,2	8xK12	8	105	96	0,701	0,860 (2160 N/mm²)
03	8 – 17	8xK17	8	239	136	0,710	
09	18 – 28	8xK26	8	311	208	0,712	
11	30 – 38	8xK31	8	351	248	0,721	

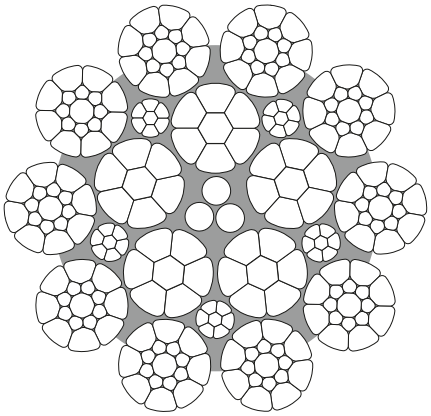
- Temperature range of use: -50°C to +100°C
- Temperature range of use for option PPI: -50°C to +80°C
- Option PPI – only available for diameter ≥ 13mm
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand
- Fleet angle must be < 1°30'

nominal diameter	metallic area	weight	calculated aggregate breaking force		minimum breaking force	
			2160 N/mm²		2160 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]
6,4	22,3	0,191	48,2	4,91	41,4	4,22
7	27,2	0,233	58,8	5,99	50,5	5,15
7,2	28,6	0,245	61,9	6,31	53,2	5,42
8	35,2	0,301	76	7,75	64,1	6,54
8,5	39,9	0,341	86,1	8,78	73,3	7,47
9	45,4	0,388	98	10	82,3	8,39
10	55,6	0,475	120	12,2	102	10,4
11	66,3	0,567	143	14,6	123	12,6
12	79,4	0,678	171	17,5	147	15
13	95,2	0,814	206	21	176	18
14	109	0,935	236	24,1	203	20,7
15	128	1,092	276	28,1	237	24,2
16	142	1,216	307	31,3	264	26,9
17	163	1,398	352	35,9	303	30,9
18	180	1,542	390	39,8	335	34,2
19	202	1,729	437	44,6	376	38,3
20	221	1,896	478	48,7	411	41,9
22	270	2,308	582	59,4	501	51,1
24	328	2,81	709	72,3	606	61,8
26	377	3,229	815	83,1	701	71,5
28	438	3,74	945	96,4	810	82,5
30	508	4,338	1097	112	942	96,1
32	575	4,901	1242	127	1066	109
34	659	5,616	1423	145	1220	124
36	733	6,246	1583	161	1358	138
38	821	7,005	1774	181	1524	155

Special constructions and diameters available - please contact us directly.

OLIVEIRA

DP 10 K



High breaking force

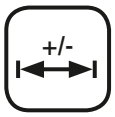
PROPERTIES

Parallel Construction

No Swivel

Compacted

Lubricated



Tolerance

APPLICATIONS

When an extremely high MBL is required for a multipart reeving hoist system: electric hoists, twin hoist systems, boom hoist and pendant rope for mobile cranes, tower cranes and all marine equipment.

OVERVIEW

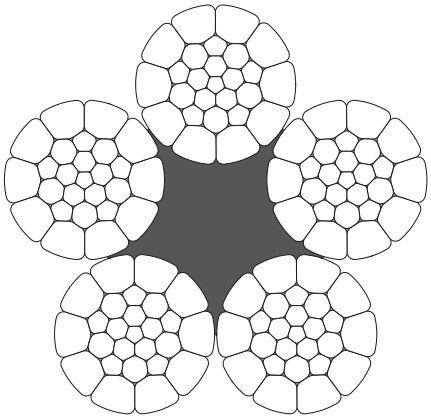
RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
05	14 – 18	10xK17	10	243	170	0,750	0,850 (2160 N/mm²)

- Temperature range of use: -50°C to +100°C
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand

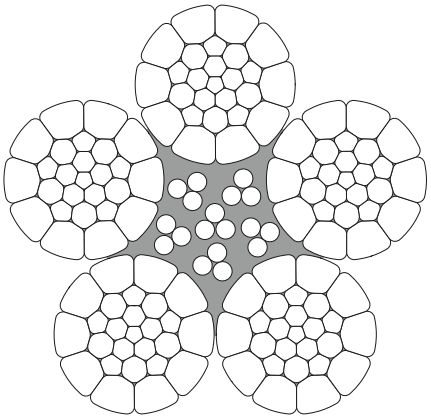
nominal diameter	metallic area	weight	calculated aggregate breaking force		minimum breaking force	
			2160 N/mm²		2160 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]
14	116	0,986	250	25,5	214,5	21,88
16	151	1,289	326	33,2	279,9	28,54
18	187	1,599	404	41,2	338,0	34,47

Special constructions and diameters available - please contact us directly.

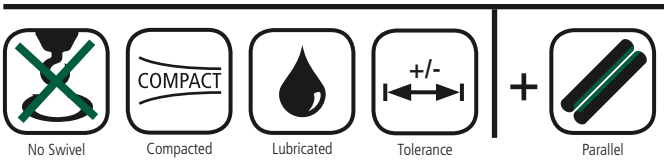
OLIVEIRA **LP 5**



OLIVEIRA **LP 5**



PROPERTIES



No Swivel | Compacted | Lubricated | Tolerance | Parallel Construction

APPLICATIONS

Suspended gondolas and platforms.
Jaw pulling device.
Overhead cranes and electric hoists.
Wind mill hoists and forest winches.

OVERVIEW

RCN	Diameter range [mm]	Construction	Number of outer strands	Number of wires	Number of outer load bearing wires	Average fill factor	Average spin factor
02	6	5x K12-CWP	5	78	60	0,633	
03	8,3 – 10,3	5x K19-CF	5	95	95	0,544	0,860 (1960 N/mm²)
05	11,5 – 14	5x K26-CF	5	130	130	0,550	0,840 (2160 N/mm²)
06	16,3	5x K31-CF	5	155	155	0,533	

- Temperature range of use: -50°C to +100°C
- Available in ordinary lay and Lang's lay
- Available in right hand and left hand

nominal diameter	metallic area	weight	calculated aggregate breaking force				minimum breaking force			
			1960 N/mm²		2160 N/mm²		1960 N/mm²		2160 N/mm²	
mm	mm²	kg/m	kN	t [metric]	kN	t [metric]	kN	t [metric]	kN	t [metric]
6	17,9	0,154	35,1	3,58	38,6	3,94	30,2	3,08	31,7	3,23
8,3	29,9	0,262			64,6	6,59			54,3	5,53
9	36,9	0,324			79,6	8,12			66,9	6,82
9,5	38,1	0,338			82,3	8,39			69,1	7,05
10,3	45,2	0,400			97,6	9,95			82,0	8,36
11,5	55,6	0,494	109	11,11			93,9	9,58		
11,6	56,4	0,501	111	11,27			95,2	9,71		
14	87,0	0,773			188	19,2			157,9	16,1
16,3	111	0,987	218	22,2			187,8	19,2		

Special constructions and diameters available - please contact us directly.

DISCARD CRITERIA

DISCARD CRITERIA ACCORDING TO ISO 4309:2010

Wire ropes should be visually inspected at frequent intervals by a competent person to make sure that the rope is in a safe condition and has not reached one of the following criteria:

1) Visible broken wires (see the following tables)
2) Reduction in rope diameter
3) Fracture of strands
4) Corrosion
5) Deformation and damage

SINGLE-LAYER AND PARALLEL-CLOSED ROPES

Number of visible broken wires for ropes working in steel sheaves.

NOTE: Ropes having outer strands of Seale construction where the number of wires in each strand is 19 or less (e.g. 6 × 19 Seale) are placed in this table two rows above that row in which the construction would normally be placed based on the number of load bearing wires in the outer layer of strands.

		Number of visible broken outer wires[2]					
		Rope working (single-layer drum)				Rope spooling (multi-layer drum)[3]	
		Sections of rop working in steel sheaves and/or spooling on a single-layer drum				Sections of rope spooling on a multi-layer drum	
		Classes M1 to M4 or class unknown[4]				All classes	
		Ordinary lay (sZ, zS)		Lang lay (sS, zZ)		Ordinary and Lang lay	
RCN	Number of load-bearing wires in the outer strands of the rope[1] n	Over a length of $6d$ [5]	Over a length of $30d$ [5]	Over a length of $6d$ [5]	Over a length of $30d$ [5]	Over a length of $6d$ [5]	Over a length of $30d$ [5]
01	$n \leq 50$	2	4	1	2	4	8
02	$51 \leq n \leq 75$	3	6	2	3	6	12
03	$76 \leq n \leq 100$	4	8	2	4	8	16
04	$101 \leq n \leq 120$	5	10	2	5	10	20
05	$121 \leq n \leq 140$	6	11	3	6	12	22
06	$141 \leq n \leq 160$	6	13	3	6	12	26
07	$161 \leq n \leq 180$	7	14	4	7	14	28
08	$181 \leq n \leq 200$	8	16	4	8	16	32
09	$201 \leq n \leq 220$	9	18	4	9	18	36
10	$221 \leq n \leq 240$	10	19	5	10	20	38
11	$241 \leq n \leq 260$	10	21	5	10	20	42
12	$261 \leq n \leq 280$	11	22	6	11	22	44
13	$281 \leq n \leq 300$	12	24	6	12	24	48
	$n > 300$	$0{,}04 \times n$	$0{,}08 \times n$	$0{,}02 \times n$	$0{,}04 \times n$	$0{,}08 \times n$	$0{,}16 \times n$

1) For the purposes of this International Standard, Filler wires are not regarded as load-bearing wires and are not included in the values of n.
2) A broken wire has two ends (counted as one wire).
3) The values apply to deterioration that occurs at the cross-over zones and interference between wraps due to fleet angle effects (and not to those sections of rope which only work in sheaves and do not spool on the drum).
4) Twice the number of broken wires listed may be applied to ropes on mechanisms whose classification is known to be M5 to M8.
5) d = nominal diameter of rope.

Classes M1 to M4 equates to mechanism group $1E_m$ to $1A_m$ | Classes M5 to M8 equates to mechanism group 2_m to 5_m
Please pay attention to the country- / application-specific standards.

ROTATION-RESISTANT ROPES

Number of visible broken wires for ropes working in steel sheaves.

NOTE: Ropes having outer strands of Seale construction where the number of wires in each strand is 19 or less (e.g. 18 × 19 Seale– WSC) are placed in this table two rows above that row in which the construction would normally be placed based on the number of wires in the outer layer of strands.

		Number of visible broken outer wires[2]			
		Rope working on a single-layer drum		Rope spooling on a multi-layer drum[3]	
		Sections of rop working in steel sheaves and/or spooling on a single-layer drum		Sections of rope spooling on a multi-layer drum	
RCN	Number of outer strands or number of load-bearing wires in the outer strands of the rope[1] n	Over a length of $6d$ [4]	Over a length of $30d$ [4]	Over a length of $6d$ [4]	Over a length of $30d$ [4]
21	4 strands $n \leq 100$	2	4	2	4
22	3 or 4 strands $n \geq 100$	2	4	4	8
	11 or more outer strands				
23–1	$71 \leq n \leq 100$	2	4	4	8
23–2	$101 \leq n \leq 120$	3	5	5	10
23–3	$121 \leq n \leq 140$	3	5	6	11
24	$141 \leq n \leq 160$	3	6	6	13
25	$161 \leq n \leq 180$	4	7	7	14
26	$181 \leq n \leq 200$	4	8	8	16
27	$201 \leq n \leq 220$	4	9	9	18
28	$221 \leq n \leq 240$	5	10	10	19
29	$241 \leq n \leq 260$	5	10	10	21
30	$261 \leq n \leq 280$	6	11	11	22
31	$281 \leq n \leq 300$	6	12	12	24
	$n > 300$	6	12	12	24

1) For the purposes of this International Standard, Filler wires are not regarded as load-bearing wires and are not included in the values of n.
2) A broken wire has two ends.
3) The values apply to deterioration that occurs at the cross-over zones and interference between wraps due to fleet angle effects (and not to those sections of rope that only work in sheaves and do not spool on the drum).
4) d = nominal diameter of rope.

Please pay attention to the country- / application-specific standards.

CONVERSION TABLE

LENGTH

1m	3,28083	ft
1m	39,36997	inch
1 km	0,621371	miles
1 ft	0,3048	m
1 mile	1,609344	km
1 inch	0,0254	m

TENSILE

1 N/mm^2	0,101972	kp/mm^2
1 N/mm^2	145,037719	psi
1 N/mm^2	10	bar
1 N/mm^2	1	Mpa

FORCE

1 kN	101,9716	kp
1 kN	0,1019716	metric tnf
1 kN	224,8089	lbf

AREA

1 mm^2	0,001550	in^2
1 m^2	10,76391	ft^2
1 ft^2	0,092903	m^2
1 in^2	645,16	mm^2
1 m^2	1,19599	$yard^2$
1 $yard^2$	0,836128	m^2

MASS

1 metric t	1000	kg
1 metric t	1,102311	short t
1 metric t	0,984207	long t
1 metric t	2204,623	lbs
1 lbs	0,453529	kg
1 long t	1,016047	metric t
1 short t	0,907185	metric t

LENGTH MASS

1 kg/m	0,671970	lbs/ft
1 lbs/ft	1,488164	kg/m