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نماینده رسمی و انحصاری پیتون آلمان در ایران

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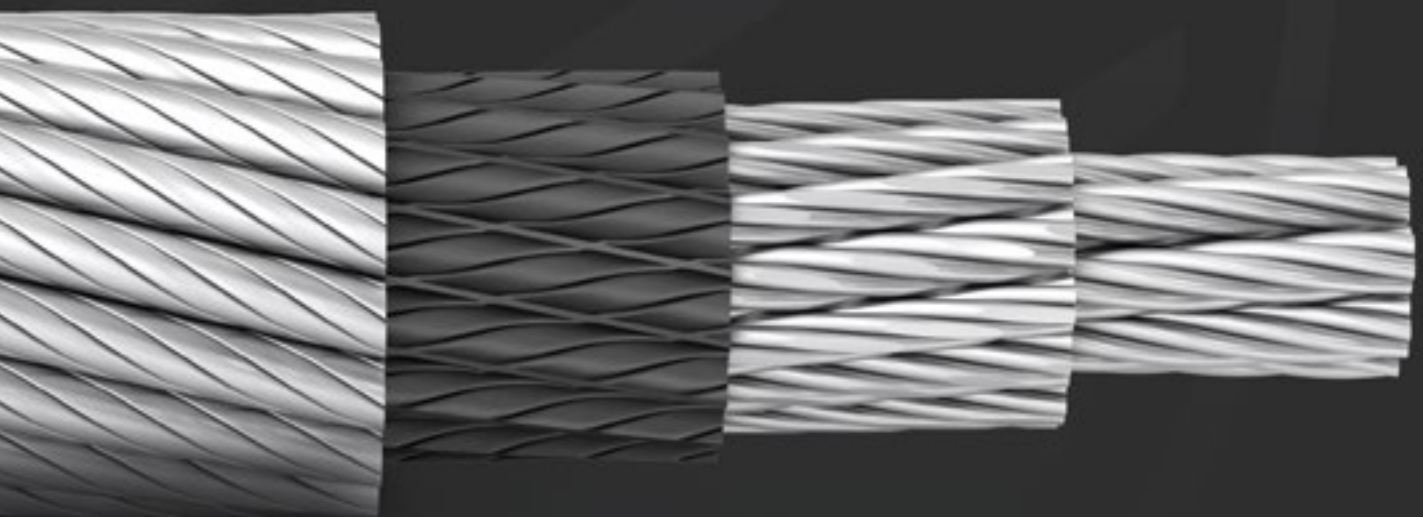
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PYTHON®

HIGH PERFORMANCE WIRE ROPE



PRODUCT CATALOG

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WHERE WE HAVE COME FROM

Westfälische Drahtindustrie GmbH (WDI) was founded in 1856 by Carl Hobrecker in Hamm, Germany under the name of "Hobrecker, Witte and Herbers" and was the first European wire manufacturer to use steam engines.

In 1872, the company was publically listed and renamed to "Aktiengesellschaft Westfälischer Draht-Industrie-Verein", forming the world's largest company for the production of drawn wires. Undergoing various structural changes, WDI later on became part of Germany's large steel corporations such as Klöckner, Krupp and Hösch.

In 1993, Werner Pampus became the majority shareholder and led WDI back to independence. Under his leadership, WDI has become one of Europe's leading wire manufacturers and a strategic partner for the wire processing industry and beyond.

WHERE WE ARE TODAY

Looking back on 150 years of tradition, WDI has evolved into the largest privately-held wire producer in Europe. Today, finished products are manufactured at 17 locations across Germany.

The group operates in eight business segments, each dedicated to high quality standards. All of them play a leading role in their particular industry. In 2014, WDI employed 1,120 personnel and achieved a gross revenue of EUR 590 Mio.



WHERE WE ARE GOING

WDI has set four key strategic goals towards which we orientate our business performance:

- increase company value
- expand the market position of our products by actively shaping the industry
- continually improve customer satisfaction with product and service quality, technology and safety
- run an economically and ecologically sustainable business.

WDI WIRE ROPE GROUP

For more than 15 decades, WDI has been synonymous for innovative wire rope that sets standards. Constant striving for perfection made us one of the global leading manufacturers of High Performance Wire Rope - growth and innovation ensure we stay ahead. We meet the industry's ever increasing demands for high quality wire rope with cost- and lifetime-optimised constructions, while providing high breakloads.

WDI's registered wire rope brand "PYTHON" was introduced in the market in the 1960's and today has grown into a globally recognised brand for High Performance Wire Rope. Being one of the co-inventors of High Performance Wire Rope, over the past decades we have developed a broad product range and comprehensive knowledge of ropes and applications.

We understand that today's cranes are becoming more and more specialised and require individual solutions instead of off-the-shelf products. With this approach, WDI has been awarded OEM by numerous crane and winch manufacturers. Hence PYTHON wire rope can be found in various common, as well as highly complex lifting applications.



MADE IN GERMANY

With four production sites in Germany, an annual output of more than 10,000 tons of PYTHON High Performance Wire Rope is generated. The formerly independent sites were integrated into the WDI group in 2004. Considering the histories of all our sites, WDI is proud to look back to 150 years of wire rope manufacturing.

DORTMUND I

Founded in 1911 with roots in the mining industry, the headquarter of WDI ropes group is located in the city of Dortmund.

DORTMUND II

Onstream since 2010, Dortmund II is located at a water channel and well prepared for the production of heavyweight wire rope.

ZWICKAU

Founded in 1861 only 27 years after the invention of the steel wire rope, Zwickau has a tradition of more than 150 years. This factory produces wire rope mainly for the offshore industry with diameters up to 124 mm.

SYKE

Having started production in 1934, Syke is WDI's youngest yet finest rope production site in the truest sense: Syke is specialised on small diameter wire rope ranging from 1 to 21 mm and stainless steel wire rope.

EVERY ROPE A PROMISE

Making High Performance wire rope requires watchmakers precision. WDI has built up extensive technical knowledge about the many characteristics of wire rope. This gives us the right switches in design and production to manufacture wire rope that matches the requirements of your application. That's why PYTHON is perceived as one of the supreme special wire rope manufacturers in the world.

For High Performance Wire Rope, one true key performance factor is the uncompromisingly high quality of the individual rope wires. The technological values of the wires determine the rope's strength and service life. Our focus on using only the best wires available gives us an advantage over the competition. PYTHON wire rope consists only of wires drawn in-house by WDI's wire business unit located in Rothenburg, home to Europe's most modern and largest wire drawing factory. In order to meet highest quality demands, we process wire rods as raw material exclusively from reknowned German producers - full material traceability guaranteed.

Our commitment to quality wire rope is reflected by the quality programs we pursue. WDI's products are produced in conformance to quality management system ISO 9001:2008 (DNV, certificate 102826) and API Spec Q1 9A (Certificates 9A-0091, 9A-0100).



WDI is certified by:

- Germanischer Lloyd (GL 13, GL 30 and GL 102)
- Lloyd's Register of Shipping (certificate MD00/1624/0006/11)
- Russian GOST (certificate 0295565)
- China Mining Products Safety Approval and Certification Center (MA)



SUBSTANTIAL BENEFITS

High Performance Wire Rope provides substantial benefits over general purpose wire rope. While in some applications, service life can be dramatically increased, other applications benefit from a significantly higher breaking load in order to reduce the size of the system components.

Often, both goals can be achieved. Over the past decades, WDI has developed and continuously improved a number of features and production techniques that make PYTHON wire rope the first choice for systems with challenging requirements.



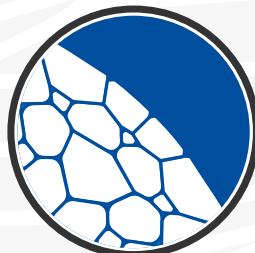
PlastGuard®



LongLife®



HiPac®



ForcePac®



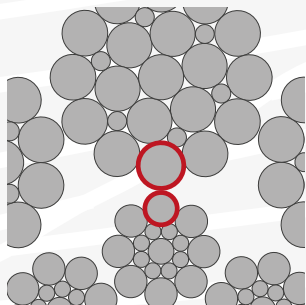
PLASTGUARD CORE ENCAPSULATION

Some PYTHON ropes have a plastic encapsulated core, dubbed **PlastGuard**. **PlastGuard** has several advantages over non-encapsulated wire rope. All of them eventually result in an extended service life of the rope and help the operator to reduce downtime. The performance of the coating material is critical for the rope's service life. Over the past decades, WDI has done extensive research and constantly improved the material.

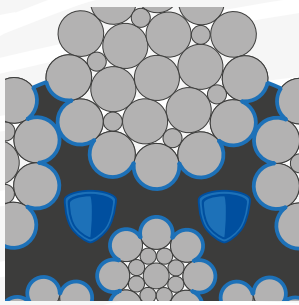


Prevention of premature core failure

In a rope, the pressure of the outer strand layer causes nicking in the wires of the strand layer beneath. Wires will fail first in these places. This represents a safety problem, as the entire rope core could fail although the rope has not indicated discard by outer wire breaks yet. **PlastGuard** provides a plastic layer between the outer layer and the core, preventing direct metal to metal contact and thus core failure. Ideally the core remains intact until wire breaks in the outer layer give warnings for a rope change.



without PlastGuard:
direct contact of adjacent rope layers

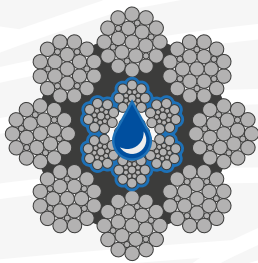


with PlastGuard:
distinct separation of rope layers

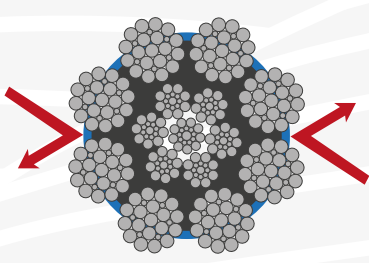
Double corrosion protection

Wire rope life decreases dramatically when lacking lubrication. Relubricating the core of a wire rope, however, can often be a problem: common relubrication methods – including pressure lubricating – cannot deliver the new lubricant to the inner core.

By encapsulating the core with **PlastGuard**, the factory lubrication is captivated inside. Wire rope life cannot diminish due to running dry. At the same time, water and particles - common reasons for rust and rope deterioration - are kept outside.



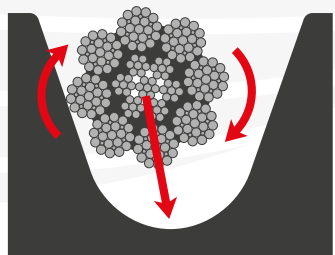
no egress of lubrication



no ingress of water or particles

Mitigates the effects of high fleet angles

High fleet angles are often the reason for the introduction of torsion into the wire rope. Having eventually developed into a bird cage or a protruding core, the wire rope has to be discarded prematurely. **PlastGuard** effectively reduces the uptake of torsion by the core and provides a stabilizing bedding for the outer strands. It helps to lift the service life of ropes in problematic reevings to an acceptable or more economic level.

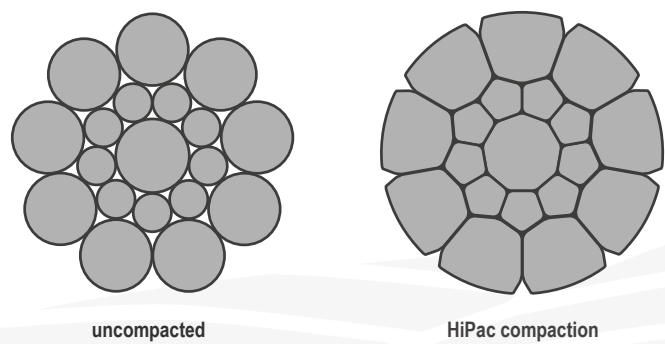


high fleet angles cause the rope to
slide AND rotate into the sheave groove



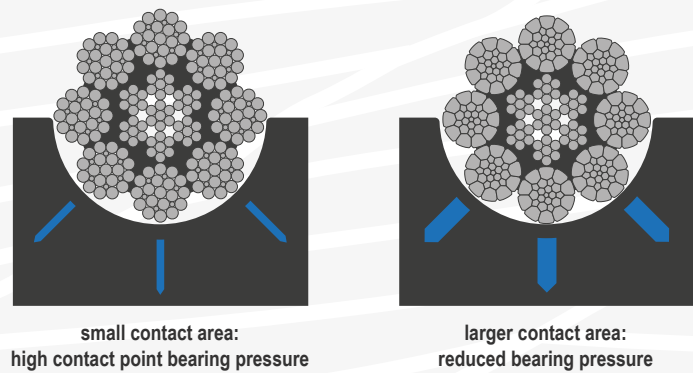
HIPAC COMPACTION TECHNIQUE

WDI's strand compaction technique **HiPac** sets the standards for gentle yet highly effective compaction of strands. Constant research on the parameters of strand compaction have led to the development of WDI's **HiPac** compaction technique. **HiPac** compromises for highest compaction grades on one hand and most gentle treatment of the wire's metal structure on the other hand. As a result, **HiPac** compaction provides highest breaking forces with least possible impact on bending fatigue, adding several benefits to PYTHON wire rope:



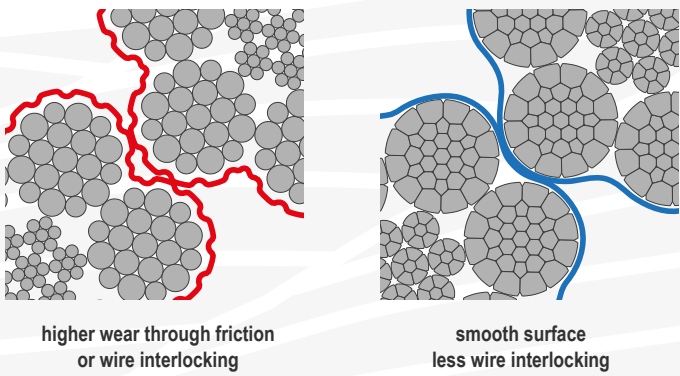
Less wear and tear

The increased contact area to drum and sheaves of the compacted strand significantly reduces wear in comparison to the uncompacted strand. While the uncompacted strand has a punctual contact to the sheave, the contact area of the compacted strand is much higher. This results in reduced wear and tear and increased service life of both rope and system components.



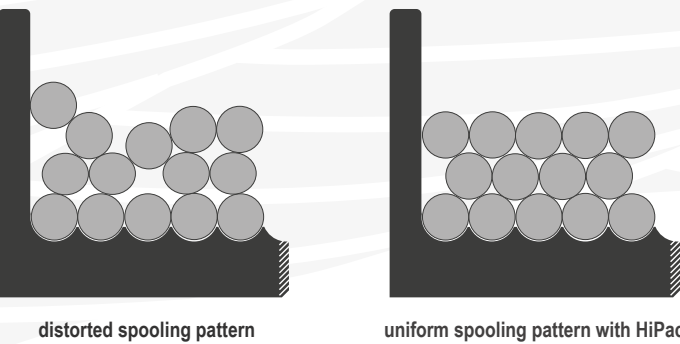
Multi-layer drums

In multi layer systems, uncompacted wire rope causes interlocking of wires of two neighbouring wraps in the crossover zones on the drum. Interlocking is often accompanied by audible crackling and in severe cases, flying sparks can be observed. This leads to accelerated failure of the outer wires, reason for early discard of the rope. **HiPac** compaction gives our ropes a smooth surface of each strand. Interlocking and hence the destruction of the outer wires is reduced effectively, elevating the rope's service life to a more economic level.



Proper spooling pattern

The rope's low tendencies to ovalisation and diameter reduction in service provide a very uniform spooling pattern, the most important requirement for Lebus multi layer systems to work correctly. **HiPac** enabled PYTHON ropes have proven to spool properly even with a high number of layers.

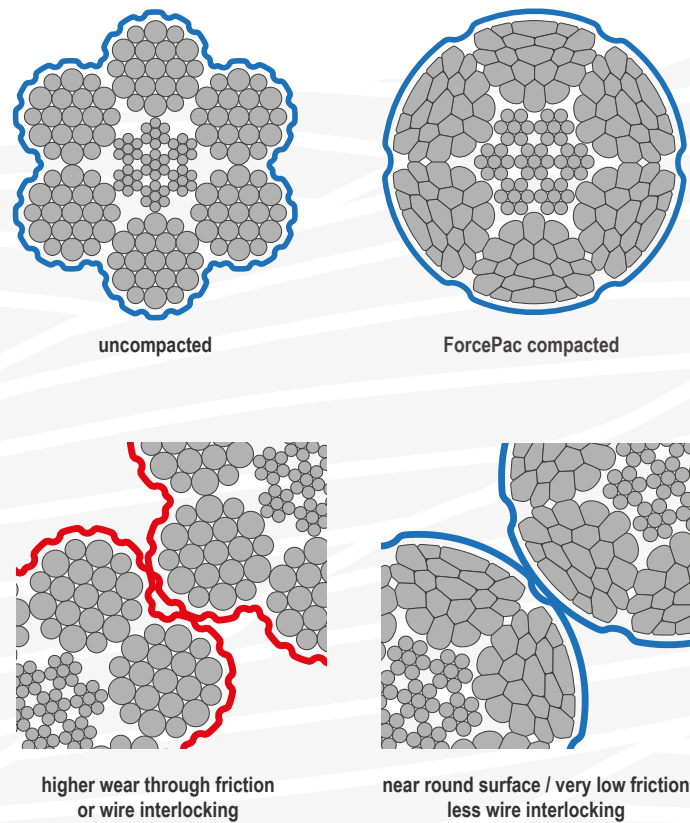




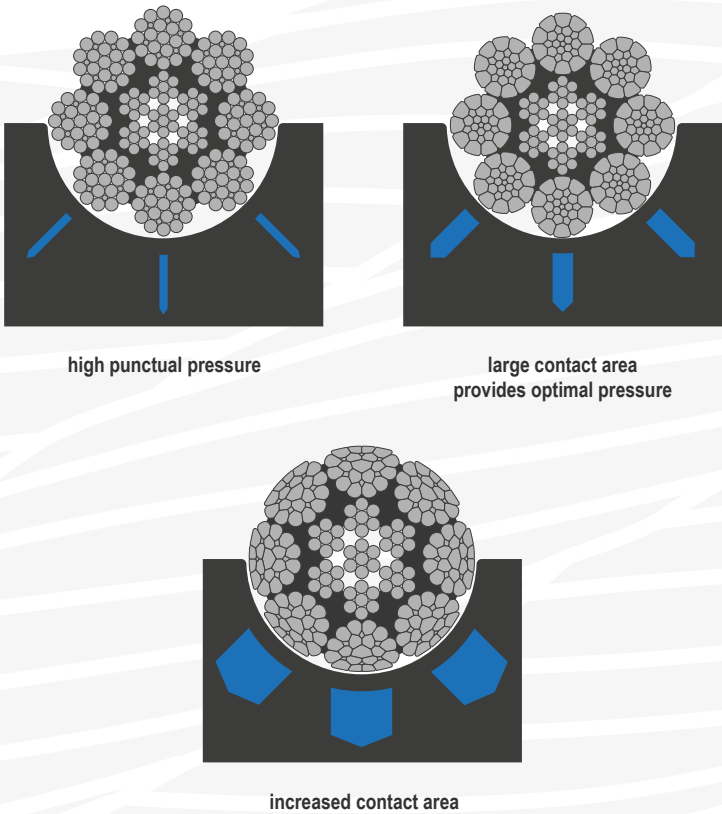
FORCEPAC COMPACTION TECHNIQUE

In multi-layer systems, the reason for wire rope discard is often not fatigue but an effect called drum crushing. Drum crushing occurs in the cross-over zones of the drum because of high line pulls, high spooling angles or interlocking wires of adjacent drum wraps. Although fatigue-wise the wire rope has not reached the end of its service life, it has to be discarded due to crushed wires and strands. While **HiPac** compacted ropes provide a high resistance, some crane systems require a more advanced solution.

WDI has developed a solution against drum crushing in multi-layer systems called **ForcePac** compaction. **ForcePac** compacted wire rope provides a smooth and near-round circumference when the drum is spooling in. Wires or strands of the adjacent wrap cannot interlock anymore. Instead they glide off their neighbouring wrap into their predetermined position in the spooling package. This reduces the damage mechanism compared to conventional wire rope by 25-50%. **ForcePac** is available for both rotation-resistant and non rotation-resistant wire rope.



An added benefit is the optimum pressure distribution in the sheave groove. An uncompacted rope is prone to high abrasion when running over sheaves due to only punctual contact of the crown wires with the sheave groove. **ForcePac** compaction provides the maximum support area. Abrasion is greatly reduced and both rope and sheave service life is significantly improved. Especially in systems with low design factors, ForcePac enabled wire rope can give economic benefits over conventional constructions.



ForcePac compacted ropes are also highly suited for applications in dirty or dusty environments such as forestry. Being dragged through mud, bent around trees and pulled over rock, conventional wire rope is prone to inner destruction by penetrating particles. With both strand and wire gaps closed, PYTHON logging ropes provide a very round and smooth surface. A dedicated catalogue from Europe's market leader in forestry wire rope is available.

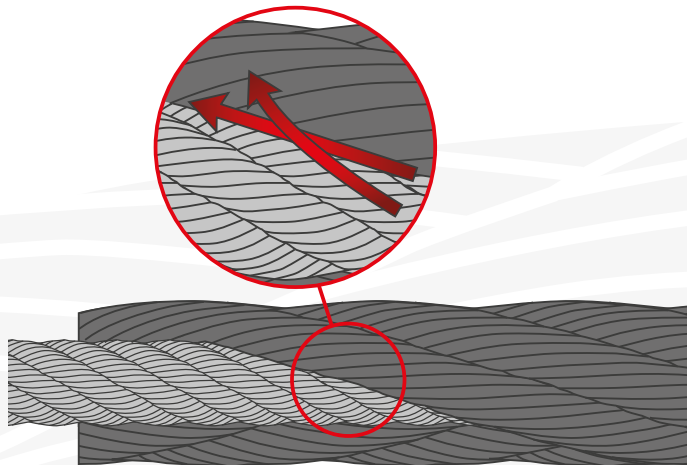


LONGLIFE ROPE DESIGN

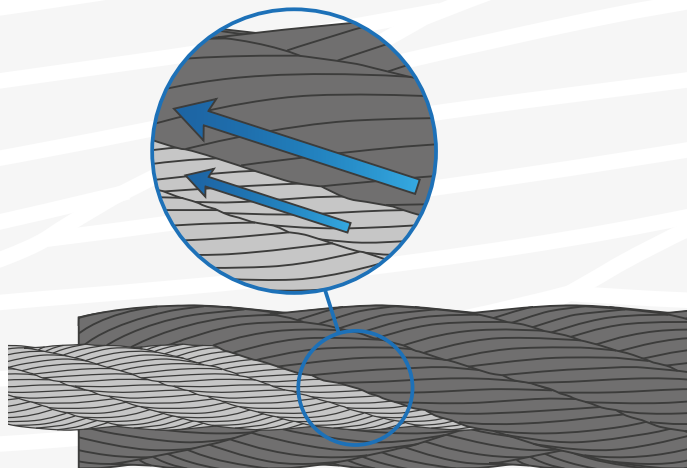
In conventionally designed wire rope, strands of different layers are arranged in a way that they cross at angles. Such a design causes nicking in the wires of adjacent strand layers. Nicked wires will break prematurely, and if not detected, can lead to core failure during service.

Certain PYTHON rope constructions feature our **LongLife** rope design that avoids internal wire and strand crossings. As a result, the wire rope provides superior fatigue resistance and therefore extended lifetime.

An added benefit for **LongLife** enabled PYTHON rope is their extremely high breaking strength. **LongLife** increases the metallic cross section area (fill factor) which results in breakloads significantly higher than in other constructions.



Crossing of strands in conventional non-rotation resistant wire rope



LongLife rope design avoids internal wire and strand crossings

SKILL & EXPERIENCE

PYTHON wire ropes wouldn't be special without the skills of our workers. While technology is an important factor, a major part of making wire rope is still craftsmanship. Skilled workers with high expertise are required to make ropes which meet our high design criteria.

WDI is proud of our personnel that embrace their jobs with an exceptional will to excel. Their dedication is proven by a very low employee turnover, resulting in an average job tenure of 20 years. We realize this as being one of our biggest assets. In order to keep this knowledge within the company, it is our philosophy to constantly develop and transfer skills to the younger generation.

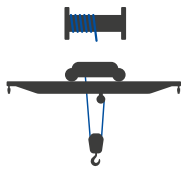


PYTHON[®]
INDUSTRY

German steel-mill using
PYTHON Flameshield 8

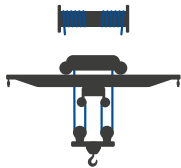
LIFTING
EXCELLENCE





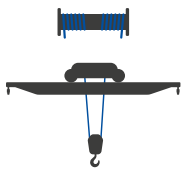
OVERHEAD CRANES (SINGLE DRUM)

HOIST LINE	HIGH LIFTING HEIGHTS
Super 8 R Super 8 C Power 9 R Power 9 S	Classic 35 Compac 35



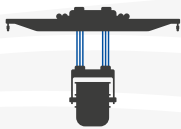
OVERHEAD CRANES (DOUBLE DRUM)

HOIST LINE (PAIRS OF LEFT AND RIGHT HANDED ROPE)
Super 8 R Super 8 C Power 9 R Power 9 S



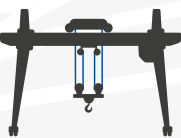
OVERHEAD CRANES (DOUBLE OPPOSITE GROOVED DRUM, SINGLE ROPE)

HOIST LINE
Multi



STEEL MILL LADLE CRANES

HOIST LINE
Flameshield 8 Super 8 C



GANTRY CRANES

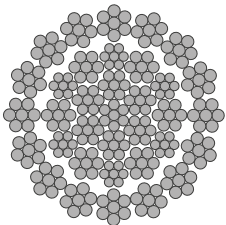
HOIST LINE
Super 8 R Super 8 C Power 9 S Ultra CP



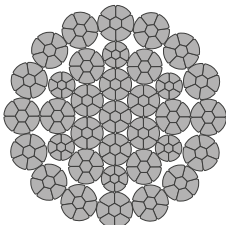
GRAB CRANES

HOIST LINE	CLOSING ROPE
Super 8 R Super 8 C	Super 8 C

ROTATION RESISTANT

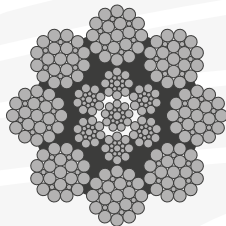


CLASSIC 35
PAGE 42

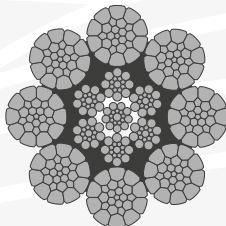


COMPAC 35
PAGE 44

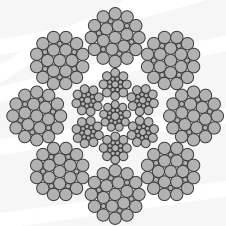
NON-ROTATION RESISTANT



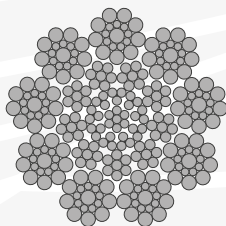
SUPER 8 R
PAGE 54



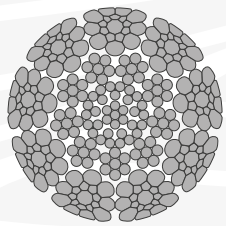
SUPER 8 C
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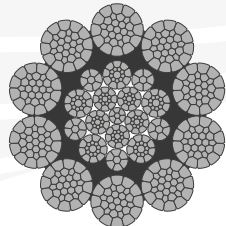
FLAMESHIELD 8
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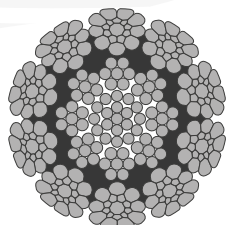
POWER 9 R
PAGE 64



POWER 9 S
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ULTRA CP
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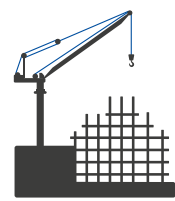


MULTI
PAGE 72



**SHAPING
SKYLINES**

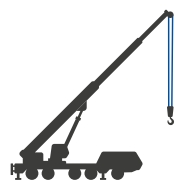
Luffing boom tower crane
using rotation resistant
PYTHON Compac 35
for the construction of the
Shanghai Tower



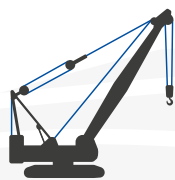
LUFFING BOOM TOWER CRANES		
MAIN HOIST	AUX HOIST	BOOM HOIST
Compac 35 Hoist C	Compac 35 Hoist C	Construct 6 Super 8 S Super 8 C Ultra CP



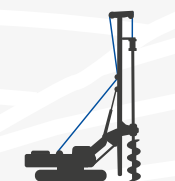
HAMMERHEAD TOWER CRANES		
MAIN HOIST	PENDANT	ERECTION & TROLLEY
Classic 35 Compac 35	Construct 6 Super 8 S Super 8 C	Construct 6



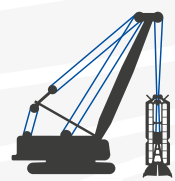
MOBILE CRANES	
MAIN HOIST	BOOM EXTENSION & RETRACTION
Compac 35 Compac 35 Plus	Power 9 S Ultra S



CRAWLER CRANES		
MAIN HOIST	BOOM HOIST	BOOM PENDANT
Compac 35 Compac 35 Plus	Construct 6 Super 8 S Super 8 C Ultra CP	Construct 6 Super 8 S Super 8 C

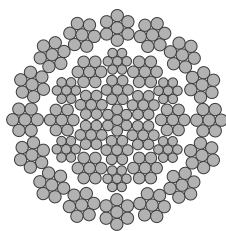


FOUNDATION CRANES / PILING RIGS		
MAIN HOIST	AUX HOIST	FEEDING ROPE
Compac 35	Compac 35 Hoist C	Construct 6 Super 8 S

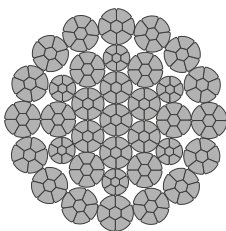


SLURRY WALL GRAB		
HOIST LINE	BOOM PENDANT	BOOM HOIST
Super 8 C	Construct 6 Super 8 S	Super 8 C
		CLOSING ROPE
		Super 8 C

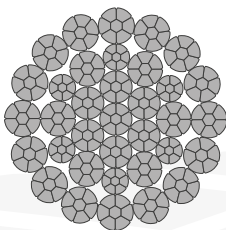
ROTATION RESISTANT



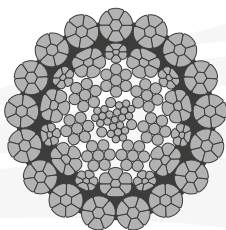
CLASSIC 35
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COMPAC 35
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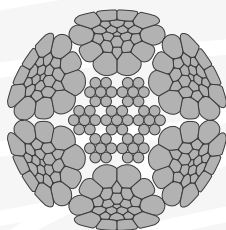


COMPAC 35
PLUS
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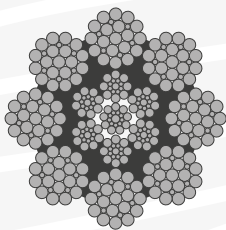


HOIST C
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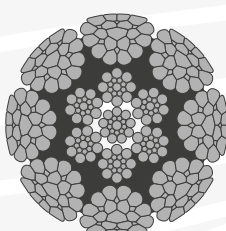
NON-ROTATION RESISTANT



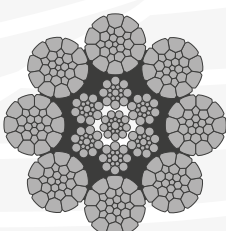
CONSTRUCT 6
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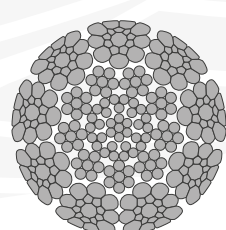
SUPER 8 R
PAGE 54



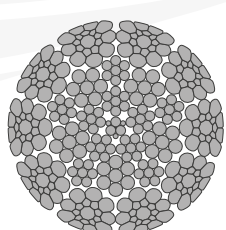
SUPER 8 S
PAGE 56



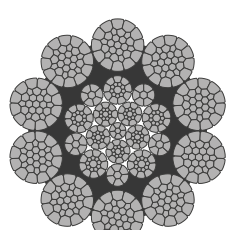
SUPER 8 C
PAGE 58



POWER 9 S
PAGE 66



ULTRA S
PAGE 68

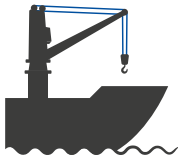


ULTRA CP
PAGE 70



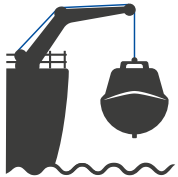
CREATING
ADVANTAGE

Bulker using
PYTHON Hoist C
as hoist line and
PYTHON Super 8 C
as boom hoist line



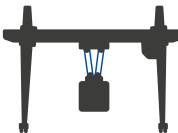
DECK CRANES

HOIST LINE	BOOM HOIST
Compac 35 Hoist C	Super 8 C Ultra CP



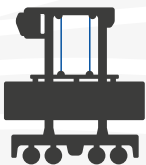
DECK HANDLING / LIFEBOATS

HOIST LINE
Compac 35 Lift



CONTAINER COMMISSIONING CRANE

HOIST LINE
Super 8 R Super 8 C Super 8 CD



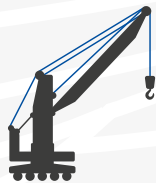
STRADDLE CARRIER

HOIST LINE
Super 8 R Super 8 C



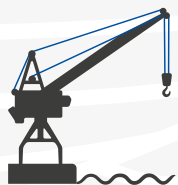
CONTAINER BRIDGE / UNLOADER

MAIN HOIST	BOOM HOIST	TROLLEY
Super 8 R Super 8 C Ultra CP	Super 8 R Super 8 C	Super 8 R Super 8 C



MOBILE HARBOR CRANE

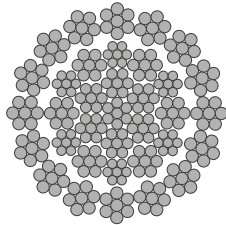
HOIST LINE
Super 8 C



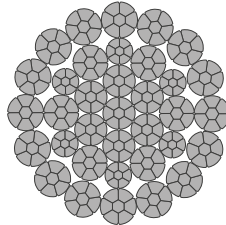
DOCKSIDE CRANE

MAIN HOIST	BOOM HOIST
Classic 35 Compac 35 Hoist C	Super 8 R Super 8 C

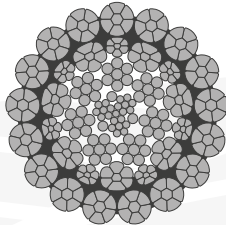
ROTATION RESISTANT



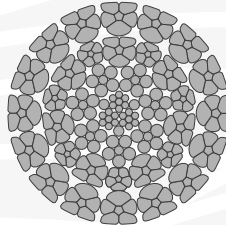
CLASSIC 35
PAGE 42



COMPAC 35
PAGE 44

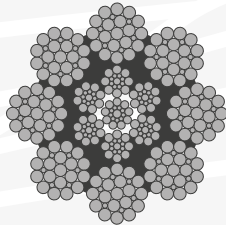


HOIST C
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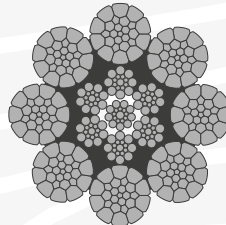


LIFT
PAGE 50

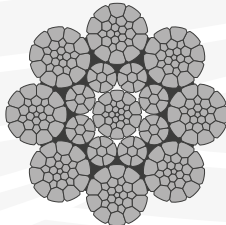
NON-ROTATION RESISTANT



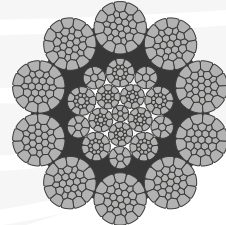
SUPER 8 R
PAGE 54



SUPER 8 C
PAGE 58



SUPER 8 CD
PAGE 60



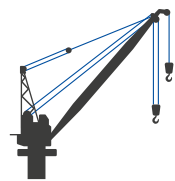
ULTRA CP
PAGE 70

Heavy lift crane vessel
hoists a platform using
PYTHON Solid 6 R.

PYTHON[®]

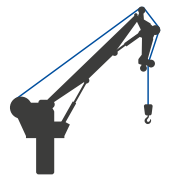
OIL & GAS

**PERFORMANCE
ON
DEMAND**



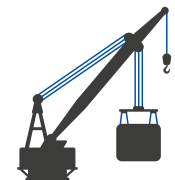
OFFSHORE PEDESTAL CRANES

MAIN HOIST	AUX HOIST	BOOM HOIST
Compac 35 Hoist C	Compac 35 Hoist C	Solid 8 C Super 8 C Super 8 CD Ultra CP



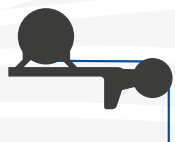
KNUCKLE BOOM CRANES

MAIN HOIST	AUX HOIST
Compac 35	Compac 35



HEAVY LIFTING CRANES

MAIN HOIST	AUX HOIST	BOOM HOIST
Solid 6 C Solid 8 C Super 8 C Compac 35	Compac 35	Super 8 C Super 8 CD



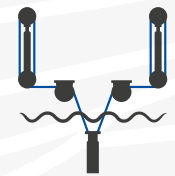
FPSO RISER PULL-IN LINES

WINCH LINE
Ultra CP Compac 35



DRILL RIGS

DRILL LINE (ACC. TO API)
Solid 6 R Solid 6 C Super 6 C Super 8 C



RISER TENSIONER LINES

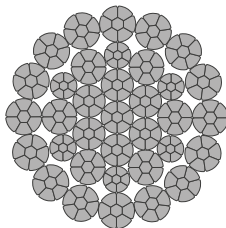
TENSIONER LINE
Super 6 C Super 8 C Super 8 CD



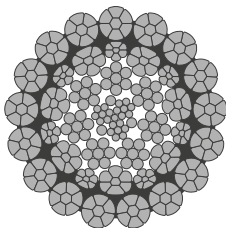
ROPES FOR STANDARD, LINEAR AND TRACTION WINCHES

WINCH LINE
Solid 6 C Solid 8 C Compac 35

ROTATION RESISTANT

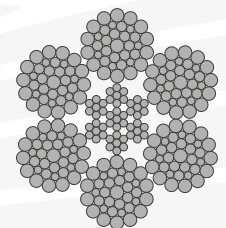


COMPAC 35
PAGE 44

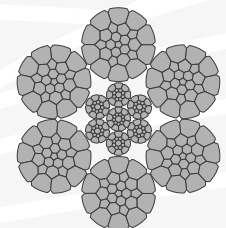


HOIST C
PAGE 48

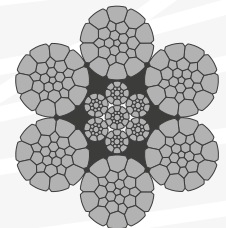
NON-ROTATION RESISTANT



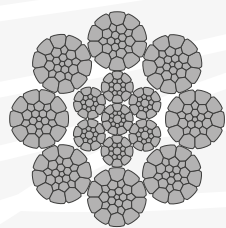
SOLID 6 R
PAGE 74



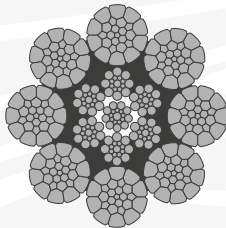
SOLID 6 C
PAGE 74



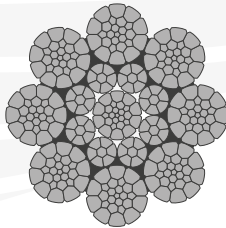
SUPER 6 C
PAGE 75



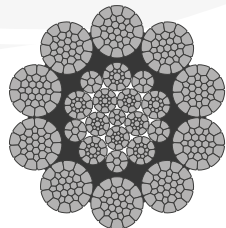
SOLID 8 C
PAGE 77



SUPER 8 C
PAGE 58



SUPER 8 CD
PAGE 60

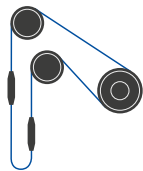


ULTRA CP
PAGE 70



German shaft with Koepe
friction hoist using a
customized PYTHON
construction

INNOVATION
THROUGH
EXPERIENCE



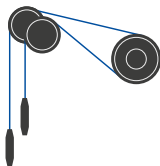
GROUND MOUNTED FRICTION HOIST (KOEPE)

HOIST ROPE		BALANCE ROPE
Solid 6 R	Classic 35 P	Classic 35
Solid 6 C		Classic 35 P
Super 8 R		Compac 35
Super 8 C		Compac 35 P



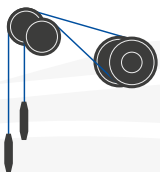
TOWER MOUNTED FRICTION HOIST

HOIST ROPE		BALANCE ROPE
Solid 6 R	Classic 35 P	Classic 35
Solid 6 C		Classic 35 P
Super 8 R		Compac 35
Super 8 C		Compac 35 P



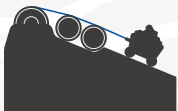
DOUBLE DRUM HOIST

HOIST ROPE	
Solid 6 C	
Super 8 C	
Ultra CP	
Compac 35 P	



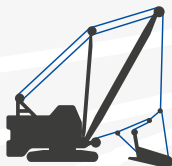
BLAIR HOIST

HOIST ROPE	
Solid 6 C	
Super 8 C	
Compac 35 P	



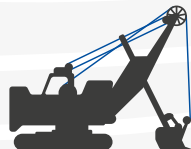
HAULAGE ROPES

HOIST ROPE	
Solid 6 C	
Super 8 C	



DRAGLINE EXCAVATORS

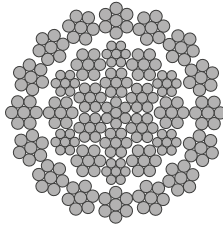
HOIST LINE	BOOM HOIST	DUMP LINE
Super 8 R	Construct 6	Super 8 C
Super 8 C	Super 8 S	
	Super 8 C	
		DRAG LINE
		Construct 6 / Super 8 S



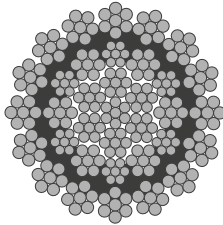
SHOVEL EXCAVATORS

HOIST LINE	BOOM PENDANT
Super 6 C	Super 8 C
Super 8 C	Ultra CP

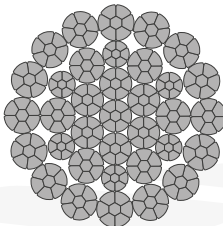
ROTATION RESISTANT



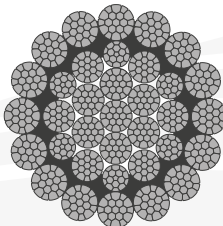
CLASSIC 35
PAGE 42



CLASSIC 35 P
PAGE 42

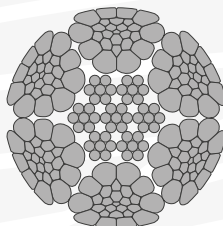


COMPAC 35
PAGE 44

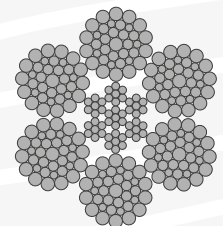


COMPAC 35 P
PAGE 44

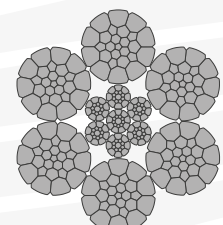
NON-ROTATION RESISTANT



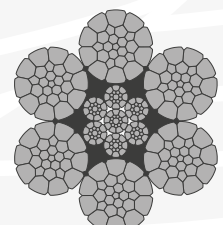
CONSTRUCT 6
PAGE 52



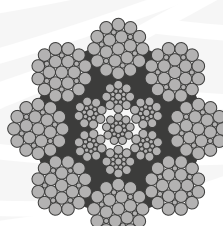
SOLID 6 R
PAGE 74



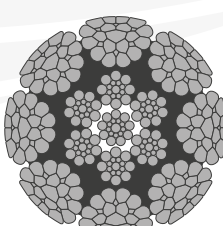
SOLID 6 C
PAGE 74



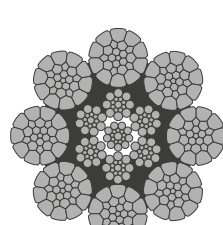
SUPER 6 C
PAGE 75



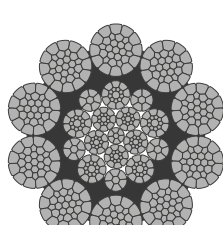
SUPER 8 R
PAGE 54



SUPER 8 S
PAGE 56



SUPER 8 C
PAGE 58



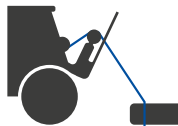
ULTRA CP
PAGE 70

PYTHON[®]
FORESTRY

Log transport
via skyline using
PYTHON 6 R+F

**MAKES
THE
DIFFERENCE**





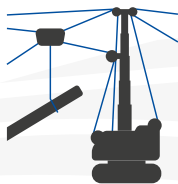
TRACTOR WINCHES

ALL PURPOSE	STONY GROUND	LIGHTWEIGHT WOOD
6 R+F	6 SV	6 WSV



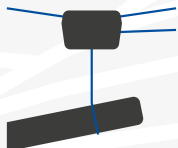
SKIDDER WINCHES

PULL ROPES
6 SV 6 WSV 6 R+F



SKYLINE YARDER

CARRYING ROPES	MAINLINES	HAULBACKLINES
6 SV 6 R+F 7 R+F	6 R+F	6 R+F
		GUYLINES
		6 R+F



WOODLINER / LIFTLINER

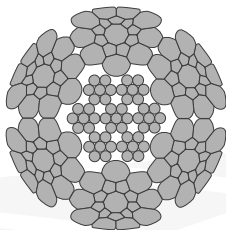
CARRYING ROPES
Super 8 S



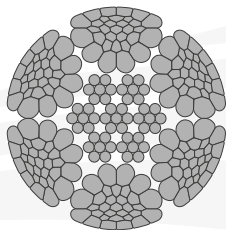
FLYING FOXES

CARRYING ROPE
6 R+F

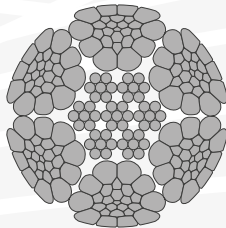
NON-ROTATION RESISTANT



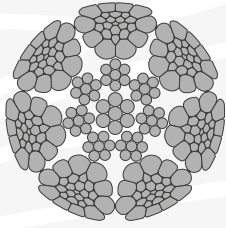
6 SV
PAGE 75



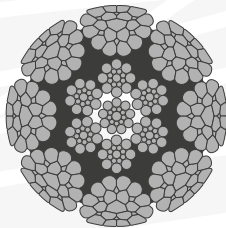
6 WSV
PAGE 76



6 R+F
PAGE 76



7 R+F
PAGE 77



SUPER 8 S
PAGE 56

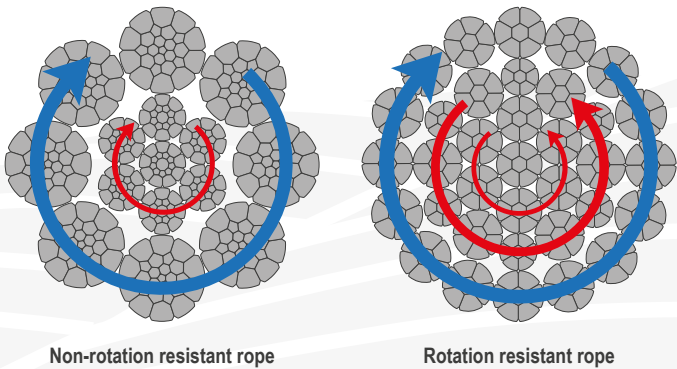
PYTHON ROPE CONSTRUCTIONS

WHEN TO USE ROTATION RESISTANT ROPES?

In every wire rope, the helicoidal structure of wires and strands generates torque once the load is lifted. In non- rotation resistant wire rope, the torque is unidirectional as all wires and strands are laid in the same direction. Hence the rope will start to rotate around its longitudinal axis trying to eliminate the torque. In multiple falls and great lifting heights, the torque would eventually cause the hook block to twist.

The working principle of rotation resistant wire rope lies in balancing the torque by means of opposite lay directions of the core and the outer strands. Therefore, in a right hand rope the core is laid left while the outer strands are right lay and vice versa.

Once the load is lifted, the torque generated by the outer lay is eliminated by the torque generated by the inner lay. The rope is stable and will not, or to a very low extent, rotate around its axis.



A wire rope is classified as rotation resistant if it rotates not more than 360° on a length of 1000 times its diameter at 20% load.

Rotation resistant ropes have to be used when:

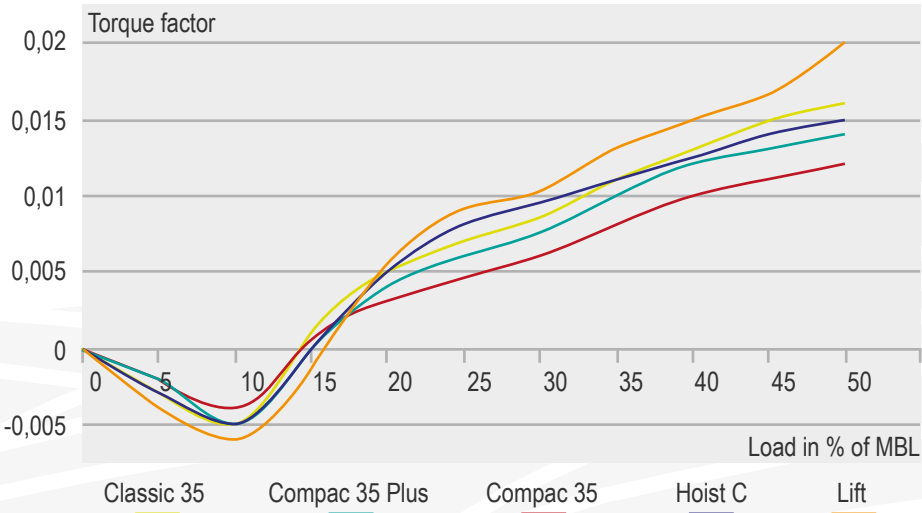
- lifting unguided loads in single fall
- lifting unguided loads in multiple falls and great lifting heights

Non-rotation resistant wire rope have to be used when:

- lifting guided loads in single fall
- lifting unguided loads in multiple falls and low lifting heights
- lifting unguided loads by pairs of left and right handed rope

ROTATIONAL BEHAVIOUR

All PYTHON rotation resistant rope constructions exceed above given classification by far over a wide load spectrum, making them first choice for applications demanding highly rotation resistant wire rope.



LAY TYPE RECOMMENDATIONS

Depending on the drum type, we recommend the following lay types for PYTHON rope constructions:

Rotation resistant PYTHON ropes (may work with a swivel)

single layer drum	recommended lay type	multi layer drum	recommended lay type
Classic 35	Cross lay	Hoist C	Lang lay
Classic 35 P	Cross lay	Lift	Cross lay
		Compac 35	Lang lay
		Compac 35 P	Lang lay
		Compac 35 Plus	Lang lay

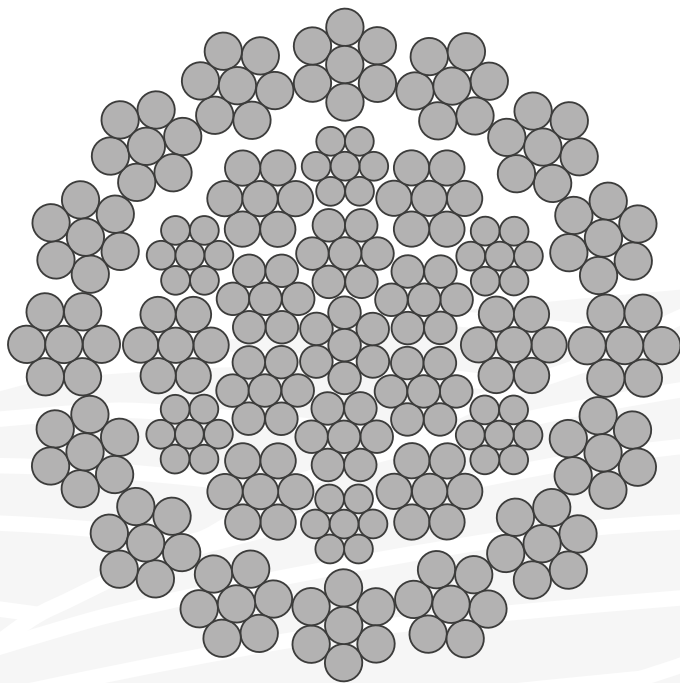
Non-rotation resistant PYTHON ropes (must not work with a swivel)

single layer drum	recommended lay type	multi layer drum	recommended lay type
Solid 6 R	Cross lay	Construct 6	Cross lay
Flameshield 8	Cross lay	Solid 6 C	Depends on application
Super 8 R	Cross lay	Solid 8 C	Depends on application
Power 9 R	Cross lay	Super 8 C	Depends on application
Multi	Cross lay	Super 8 S	Cross lay
		Super 8 CD	Depends on application
		Power 9 S	Cross lay
		Ultra S	Cross lay
		Ultra CP	Depends on application

PYTHON CLASSIC 35 / CLASSIC 35 P

APPLICATION INFORMATION

breaking strength	●●●○○	rotation resistant	yes
bending performance	●●●●○	use with swivel	yes
drum crush resistance	N/A	rec. max fleet angle	2,0°
abrasion resistance	●●○○○	multi layer suited	no
lateral pressure stability	N/A		



optionally available
with PlastGuard
protection as
CLASSIC 35 P
[same break-
loads apply]

ROPE CHARACTERISTICS

Uncompacted, very flexible rope with LongLife designed core to prevent premature core deterioration. Use as hoist line on single layer drums in mobile cranes, tower cranes, high lifting height overhead cranes or any other application with requirement for rotation resistant rope and moderate breaking strength.

construction 35(W)x7-WSC	number of wires 245	load bearing outer wires 112
number of strands 35	manufacturing tolerance +2% / +4%	available in regular- / lang lay

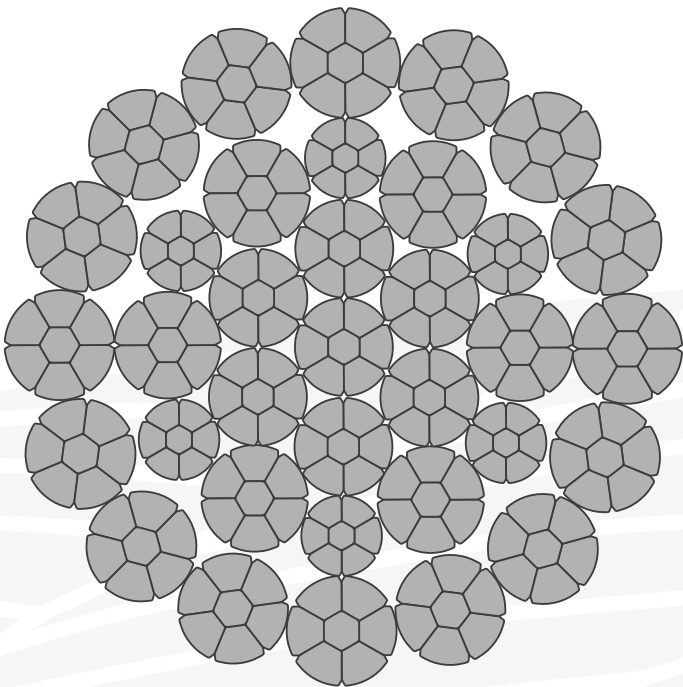
Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load		
		1770 N/mm² [kN]	1960 N/mm² [kN]	2160 N/mm² [kN]
5/16"	26,6	44	49	54
8	26,6	44	49	54
9	33,7	55	61	68
3/8"	37,8	62	69	76
10	41,6	69	76	84
11	50,8	84	93	102
7/16"	50,8	84	93	102
12	59,9	99	109	120
1/2"	67,1	110	122	135
13	70,3	116	128	141
14	81,6	134	149	164
9/16"	85,1	140	155	171
15	93,6	154	171	188
5/8"	106,5	175	194	214
16	106,5	175	194	214
17	120,2	198	219	242
18	134,8	222	246	271
19	150,2	247	274	302
3/4"	150,2	247	274	302
20	175,0	277	307	334
21	195,0	303	336	370
22	210,7	345	382	421
7/8"	211,0	345	382	421
23	234,1	384	425	468
24	252,7	414	459	505
25	274,4	450	498	549
1"	286,0	467	517	570
26	298,5	489	542	597
27	320,6	525	582	641
28	344,9	565	626	690
1-1/8"	357,0	584	647	713
29	367,8	603	667	736
30	394,5	647	716	789
31	420,6	689	763	841
1-1/4"	449,0	736	814	898
32	448,8	736	814	898
33	474,3	777	861	949
34	503,6	825	914	1.007
1-3/8"	535,0	877	971	1.070
35	535,1	877	971	1.070
36	567,2	930	1.029	1.134
38	632,3	1.036	1.148	1.265
1-1/2"	634,0	1.039	1.151	1.268
40	699,6	1.146	1.270	1.399
1-5/8"	740,0	1.213	1.344	1.481
42	768,7	1.260	1.395	1.537
44	842,4	1.381	1.529	1.685
1-3/4"	851,1	1.395	1.545	1.702
46	930,7	1.525	1.689	1.861
1-7/8"	983,0	1.612	1.785	1.967
48	1.012,2	1.659	1.837	2.024
50	1.095,7	1.796	1.988	2.191
2"	1.135,5	1.858	2.057	2.267

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

PYTHON COMPAC 35 / COMPAC 35 P

APPLICATION INFORMATION

breaking strength	●●●●○	rotation resistant	yes
bending performance	●●●●○	use with swivel	yes
drum crush resistance	●●●●○	rec. max fleet angle	2,0°
abrasion resistance	●●●●○	multi layer suited	yes
lateral pressure stability	●●●●○		



optionally available
with PlastGuard
protection as
COMPAC 35 P
[same break-
loads apply]

ROPE CHARACTERISTICS

HiPac compacted, flexible rope with a very high breaking load, perfectly suited for multi layer spooling. Due to the complex LongLife core design the rope is very flexible and durable over competitive products with low number of inner strands. Excellent results on tower cranes, mobile cranes, crawler cranes and offshore pedestal cranes. Available in high diameters for offshore winches and knuckle boom cranes.

construction	number of wires	load bearing outer wires
10-48mm: 35(W)xK7-KWSC	245	112
49-59mm: 35(W)xK17S-KWSC	537	272
60-80mm: 35(W)xK19W-KWSC	647	304
81-100mm: 35(W)xK25F-KWSC	850	304
100+ mm: 35(W)xK31WS-KWSC	1018	496
number of strands	manufacturing tolerance	available in
35	+2% / +4%	regular- / lang lay

Minimum breaking load

Nominal diameter [mm/inch]	Mass weight [kg/100m]	1960 N/mm ² [kN]	2060 N/mm ² [kN]	2160 N/mm ² [kN]
5/16"	30,7	56	59	62
8	30,7	56	59	62
9	38,9	71	74	78
3/8"	43,4	79	83	87
10	48,0	87	91	96
11	58,1	106	111	116
7/16"	58,1	106	111	116
12	69,1	126	132	138
1/2"	77,1	140	147	154
13	81,1	147	154	162
14	94,1	171	180	188
9/16"	96,0	174	183	196
15	108,0	196	206	216
5/8"	122,8	223	235	246
16	122,8	223	235	246
17	138,7	252	265	278
18	155,5	283	297	311
19	173,2	315	331	347
3/4"	173,7	316	332	348
20	195,0	338	355	373
21	215,0	385	404	424
22	241,0	436	458	480
7/8"	243,5	438	461	483
23	267,0	481	506	530
24	284,0	512	538	564
25	312,0	563	592	620
1"	322,4	587	617	647
26	335,0	605	636	667
27	360,0	649	683	716
28	391,0	705	741	777
1 - 1/8"	402,8	733	771	808
29	413,0	745	783	821
30	446,0	804	845	886
31	478,0	862	906	950
1 - 1/4"	495,6	902	948	994
32	503,0	907	953	999
33	536,0	956	1.004	1.053
34	574,0	1.023	1.075	1.127
1 - 3/8"	600,7	1.080	1.135	1.190
35	606,0	1.080	1.135	1.190
36	642,0	1.144	1.202	1.260
38	718,0	1.279	1.344	1.409
1 - 1/2"	713,9	1.283	1.348	1.414
40	793,0	1.412	1.484	1.557
1 - 5/8"	833,7	1.486	1.561	1.637
42	870,0	1.549	1.629	1.708
44	948,0	1.690	1.776	1.862

ROTATION RESISTANT

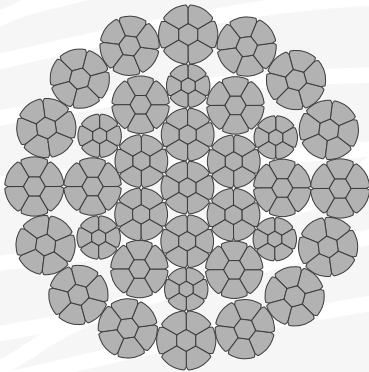
ROTATION RESISTANT

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load		
		1960 N/mm ² [kN]	2060 N/mm ² [kN]	2160 N/mm ² [kN]
1 - 3/4"	957,7	1.707	1.794	1.881
46	1.040,0	1.858	1.953	2.048
1 - 7/8"	1.131,2	2.009	2.111	2.214
48	1.140,0	2.024	2.128	2.231
50	1.230,0	2.184	2.295	2.382
2"	1.249,7	2.219	2.332	2.421
52	1.320,0	2.357	2.477	2.545
2 - 1/8"	1.419,5	2.536	2.665	2.739
54	1.420,0	2.537	2.666	2.740
56	1.550,0	2.758	2.899	2.979
2 - 1/4"	1.604,2	2.867	3.013	3.096
58	1.660,0	2.960	3.111	3.196
60	1.770,0	3.158	3.319	3.446
2 - 3/8"	1.779,7	3.175	3.337	3.465
62	1.880,0	3.356	3.528	3.662
2 - 1/2"	1.975,6	3.520	3.699	3.840
64	2.000,0	3.565	3.746	3.889
66	2.140,0	3.811	4.005	4.157
2 - 5/8"	2.189,5	3.928	4.129	4.286
68	2.260,0	4.031	4.237	4.398
2 - 3/4"	2.404,8	4.294	4.512	4.637
70	2.410,0	4.303	4.522	4.647
72	2.540,0	4.531	4.762	4.894
2 - 7/8"	2.610,0	4.657	4.895	5.030
74	2.700,0	4.808	5.053	5.193
76	2.840,0	5.066	5.325	5.472
3"	2.847,5	5.079	5.339	5.486
78	2.990,0	5.335	5.607	5.762
3 - 1/8"	3.064,7	5.469	5.749	5.906
80	3.130,0	5.574	5.859	6.020
82	3.290,0	5.865	6.164	6.399
3 - 1/4"	3.312,1	5.904	6.205	6.442
84	3.480,0	6.203	6.520	6.768
3 - 3/8"	3.560,3	6.352	6.676	6.859
86	3.620,0	6.451	6.780	6.967
88	3.790,0	6.755	7.100	7.295
3 - 1/2"	3.875,6	6.909	7.261	7.462
90	3.990,0	7.118	7.481	7.687
92	4.140,0	7.380	7.756	7.970
3 - 5/8"	4.143,6	7.386	7.763	7.977
94	4.340,0	7.729	8.123	8.347
3 - 3/4"	4.431,6	7.905	8.309	8.537
96	4.560,0	8.125	8.540	8.775
98	4710,0	8.391	8.819	9.063
3 - 7/8"	4730,7	8.428	8.858	9.103
100	4.910,0	8.754	9.200	9.454

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

APPLICATION INFORMATION

breaking strength	●●●●●	rotation resistant	yes
bending performance	●●●●○	use with swivel	yes
drum crush resistance	●●●●○	rec. max fleet angle	2,0°
abrasion resistance	●●●●○	multi layer suited	yes
lateral pressure stability	●●●●●		



Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load
		2160 N/mm ² [kN]
5/8"	130,0	272
16	130,0	272
17	143,0	302
18	162,0	341
19	177,0	382
3/4"	177,0	382
20	200,0	421
21	217,0	460
22	238,0	503
7/8"	240,0	509
23	260,0	550
24	283,0	599
25	308,0	656
1"	320,0	684
26	331,0	696
27	358,0	741
28	385,0	798
1 - 1/8"	402,0	814
29	412,0	851
30	441,0	892
31	473,0	976
1 - 1/4"	497,0	1.029
32	511,0	1.085
33	540,5	1.128
34	570,0	1.170

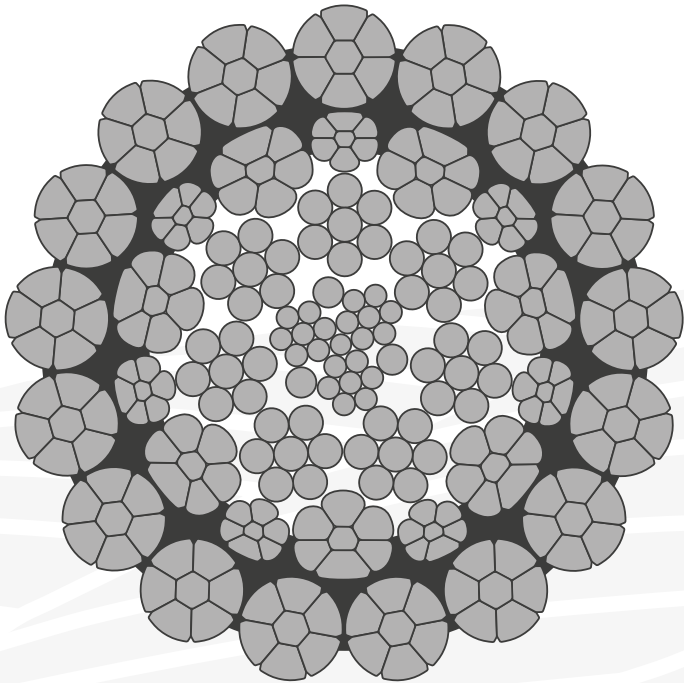
ROPE CHARACTERISTICS

Enhanced version of Compac 35 for applications with extreme breaking strength requirements. Improved pressure stability.

construction 35(W)xK7-KWSC	number of wires 245	load bearing outer wires 112
number of strands 35	manufacturing tolerance +2% / +4%	available in regular- / lang lay

APPLICATION INFORMATION

breaking strength	●●●●○	rotation resistant	yes
bending performance	●●●●○	use with swivel	yes
drum crush resistance	●●●●○	rec. max fleet angle	2,0°
abrasion resistance	●●●●○	multi layer suited	yes
lateral pressure stability	●●●●○		



HIPAC



PLASTGUARD

ROPE CHARACTERISTICS

Flexible high strength hoist rope for offshore cranes and deck cranes. The PlastGuard protection makes this rope less sensitive to high fleet angles. The ForcePac'd core in connection with the HiPac compacted outer layer provide very good pressure resistance on multi layer drums. An in-house developed long lasting lubrication formula protects the rope during long idle times.

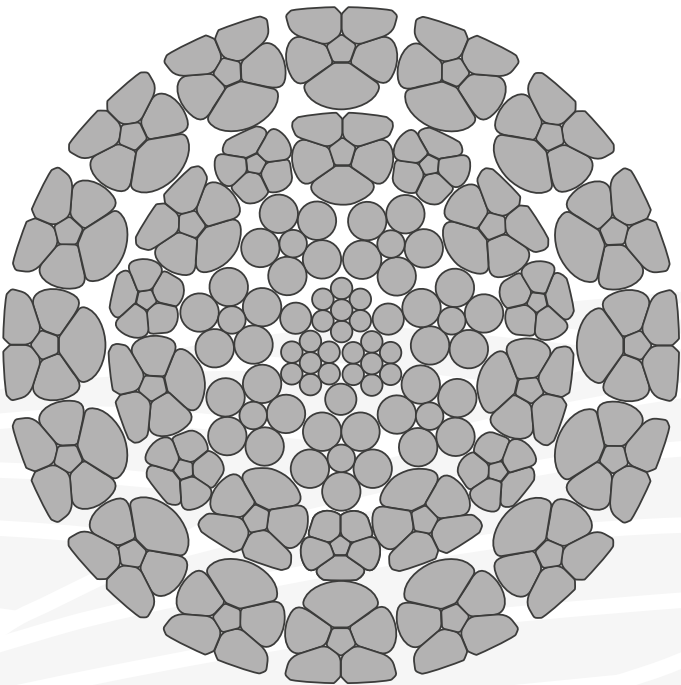
construction 41(W)xK7-EPKWSC	number of wires 291	load bearing outer wires 119
number of strands 41	manufacturing tolerance +2% / +4%	available in regular- / lang lay

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1960 N/mm ² [kN]	2160 N/mm ² [kN]
12	68,4	136	143
1/2"	74,9	151	158
13	78,0	153	163
14	89,3	179	188
9/16"	94,2	190	199
15	103,9	208	218
5/8"	117,3	236	247
16	118,7	237	248
17	133,1	262	279
18	150,0	300	315
19	169,5	338	355
3/4"	169,5	338	355
20	186,9	374	392
21	205,8	412	432
22	224,7	450	472
7/8"	229,6	461	484
23	248,5	497	516
24	272,3	543	559
25	294,7	580	612
1"	302,7	608	638
26	317,0	633	664
27	340,5	679	713
28	364,0	726	761
1-1/8"	381,4	767	804
29	389,6	778	816
30	415,2	830	870
31	442,2	883	926
1-1/4"	466,3	931	976
32	469,2	937	982
33	499,8	999	1.047
34	530,4	1.061	1.112
1-3/8"	564,8	1.128	1.183
35	565,9	1.130	1.185
36	601,4	1.200	1.258
38	659,8	1.318	1.382
1-1/2"	668,9	1.328	1.386
40	731,7	1.461	1.532
1-5/8"	780,0	1.558	1.634
42	817,7	1.635	1.714
44	898,9	1.795	1.882
1-3/4"	908,1	1.813	1.901
46	988,9	1.974	2.070
1-7/8"	1.030,5	2.060	2.160
48	1.044,8	2.091	2.193

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

APPLICATION INFORMATION

breaking strength	●●●●●	rotation resistant	yes
bending performance	●●○○○	use with swivel	yes
drum crush resistance	●●●●●	rec. max fleet angle	2,0°
abrasion resistance	●●●●●	multi layer suited	yes
lateral pressure stability	●●●●●		



ROTATION RESISTANT

ROPE CHARACTERISTICS

Lift features the ForcePac compaction on both the core and the outer lay. Boasting with very high breaking strength, it is the ideal rope for low frequency cranes such as life boat davits or high capacity crawler cranes. It comes with excellent pressure stability and abrasion resistance for use in multi layer systems with high line pulls.

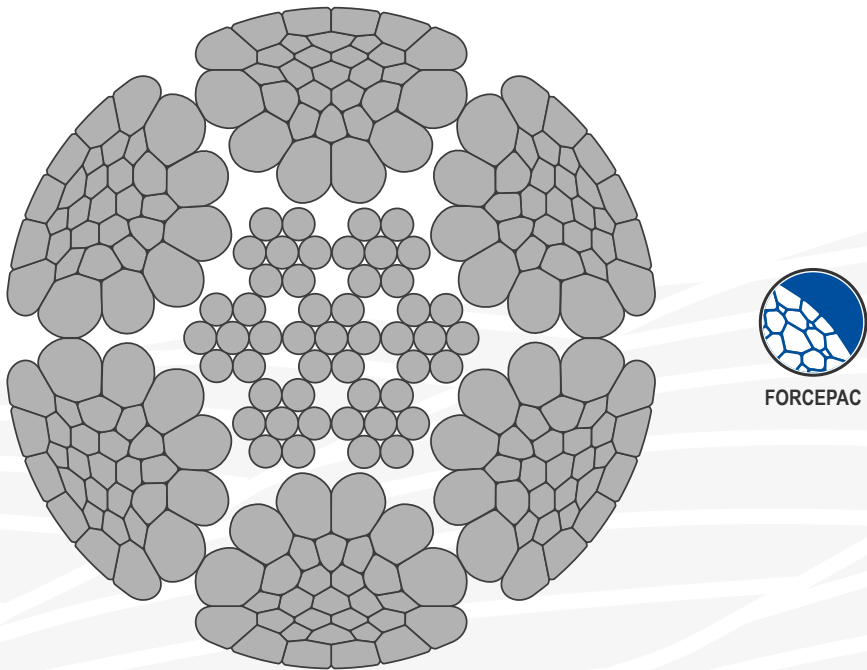
construction 39(W)xK6-KWSC	number of wires 241	load bearing outer wires 75
number of strands 39	manufacturing tolerance +2% / +4%	available in regular lay

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1960 N/mm ² [kN]	2160 N/mm ² [kN]
10	47,0	96	106
11	57,0	116	128
7/16"	57,4	118	130
12	68,0	139	153
1/2"	77,2	158	164
13	79,0	163	179
14	92,0	189	208
9/16"	97,3	199	220
15	106,0	217	239
5/8"	119,4	238	247
16	120,0	246	272
17	136,0	278	307
18	152,0	312	344
19	169,0	347	383
3/4"	171,8	347	383
20	188,0	385	424
21	207,5	425	469
22	227,0	466	513
7/8"	234,5	471	519
23	248,5	510	562
24	270,0	554	611
25	293,5	602	664
1"	305,2	604	665
26	317,0	651	717
27	342,5	703	774
28	368,0	755	832
1-1/8"	388,4	768	847
29	395,0	810	893
30	422,0	866	955
31	451,0	926	1.020
1-1/4"	479,5	949	1.045
32	480,0	986	1.086

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

APPLICATION INFORMATION

breaking strength	●●●●○	rotation resistant	no
bending performance	●●●○	use with swivel	no
drum crush resistance	●●●●●	rec. max fleet angle	4,0°
abrasion resistance	●●●●●	multi layer suited	yes
lateral pressure stability	●●●●○		



ROPE CHARACTERISTICS

Construct 6 is a swaged rope which is constructed from specialty made engineered and sized 6-strand wire rope. The basic wire rope is specially manufactured to the perfect specifications for swage compacting into the finished product. The degree of swage compacting is carefully selected to ensure the best compromise between crush- and fatigue resistance. Because of the swage compacting process, most of the rope's initial stretch (constructional stretch) has already been removed.

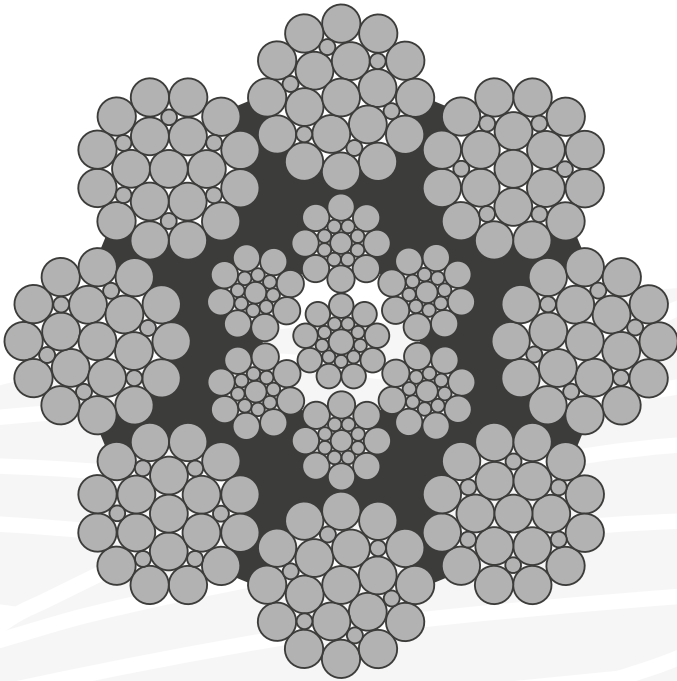
Construct 6 is a budget solution for applications which require a crush resistant rope to be used on multiple layer winding systems; for instance boom hoist line on lattice boom mobile- and tower cranes and as a general purpose winch rope for heavy duty applications.

construction 7-25,4mm: 6xK31WS-IWRC 26-36mm: 6xK36WS-IWRC	number of wires 235 265	load bearing outer wires 186 216
number of strands 6+IWRC	manufacturing tolerance +2% / +4%	available in regular lay

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load
		1960 N/mm ² [kN]
1/4"	22,0	40
7	23,7	43
5/16"	38,0	67
8	38,0	67
9	46,0	82
3/8"	51,0	93
10	55,0	98
11	66,0	116
7/16"	66,0	116
12	76,0	136
1/2"	88,0	156
13	88,0	156
14	101,0	179
9/16"	101,0	179
15	114,0	203
5/8"	129,0	230
16	129,0	230
17	144,0	257
18	159,0	283
19	175,0	325
3/4"	176,0	325
20	193,0	343
21	211,5	387
22	230,0	432
7/8"	231,0	432
23	256,5	457
24	283,0	481
25	300,5	521
1"	302,0	557
26	318,0	561
27	335,0	635
28	352,0	708
1 - 1/8"	353,0	708
29	381,5	723
30	411,0	737
31	439,0	790
1 - 1/4"	469,0	843
32	469,0	843
33	502,5	898
34	536,0	953
1 - 3/8"	571,0	1.007
35	571,0	1.007
36	606,0	1.062

APPLICATION INFORMATION

breaking strength	●●●○○	rotation resistant	no
bending performance	●●●●●	use with swivel	no
drum crush resistance	N/A	rec. max fleet angle	4,0°
abrasion resistance	●●●○○	multi layer suited	no
lateral pressure stability	N/A		



ROPE CHARACTERISTICS

Highly flexible rope for a wide variety of cranes with moderate breakload requirements. The 8-strand construction provides an excellent combination of flexibility, fatigue life, and abrasion resistance. Super 8 R is in many applications the step upward from 6x36, providing reduced downtime and installation costs. Suited as hoist line in systems using a left and right handed rope and in multi-fall applications with low lifting heights.

construction 10-50mm: 8x25F-EPIWRC 51-60mm: 8x36WS-EPIWRC 61+ mm: 8x41WS-EPIWRC	number of wires 249 / 321 409 449	load bearing outer wires 152 288 328
number of strands 8+IWRC	manufacturing tolerance +2% / +4%	available in regular- / lang lay

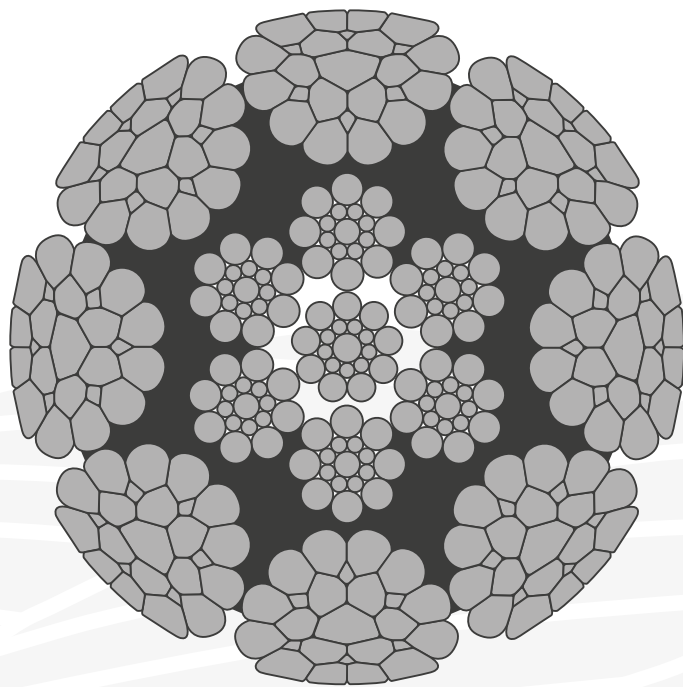
Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load		
		1770 N/mm ² [kN]	1960 N/mm ² [kN]	2160 N/mm ² [kN]
10	42,0	75	83	87
11	51,0	91	101	105
7/16"	51,0	91	101	105
12	61,0	108	120	121
1/2"	66,5	115	130	138
13	72,0	127	141	149
14	82,0	147	163	171
9/16"	85,7	150	168	178
15	95,0	169	187	195
5/8"	102,9	181	201	214
16	108,0	192	213	219
17	123,0	217	240	252
18	137,0	243	269	279
19	153,0	271	300	309
3/4"	153,0	271	300	309
20	169,0	300	332	347
21	187,0	332	367	384
22	205,0	363	402	420
7/8"	205,7	364	403	427
23	224,4	398	441	456
24	243,0	432	479	496
25	255,9	454	502	545
1"	268,7	477	526	558
26	285,0	507	562	586
27	308,0	548	607	631
28	331,0	588	652	676
1-1/8"	342,9	606	671	712
29	361,5	641	710	746
30	380,0	676	748	780
31	406,0	722	800	834
1-1/4"	424,0	751	830	881
32	432,0	769	851	889
33	460,0	818	906	943
34	488,0	868	961	997
1-3/8"	510,7	902	1.000	1.061
35	518,0	920	1.019	1.061
36	548,0	973	1.077	1.144
38	610,0	1.084	1.200	1.275
1-1/2"	613,0	1.086	1.203	1.277
40	676,0	1.201	1.330	1.406
1-5/8"	697,6	1.239	1.372	1.489
42	745,0	1.344	1.466	1.552
44	817,0	1.453	1.609	1.703
1-3/4"	845,0	1.502	1.663	1.721
46	894,0	1.588	1.759	1.858
1-7/8"	946,0	1.681	1.862	1.965
48	973,0	1.729	1.915	2.021
50	1.056,0	1.877	2.078	2.167
2"	1.094,7	1.945	2.154	2.243
52	1.142,0	2.030	2.248	2.339

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

APPLICATION INFORMATION

breaking strength	●●●●○	rotation resistant	no
bending performance	●●●○○	use with swivel	no
drum crush resistance	●●●●●	rec. max fleet angle	4,0°
abrasion resistance	●●●●●	multi layer suited	yes
lateral pressure stability	●●●●○		

NON - ROTATION RESISTANT



ROPE CHARACTERISTICS

Super 8 S is a specialist in applications with severe drum crushing or in applications where material ingress causes a short rope service life (e.g. excavator draglines). The ForcePac compaction ensures a very closed and round rope surface, providing smooth and even spooling plus reduced wear and tear. Suited as hoist line in systems using a left and right handed rope and in multi-fall applications with low lifting heights.

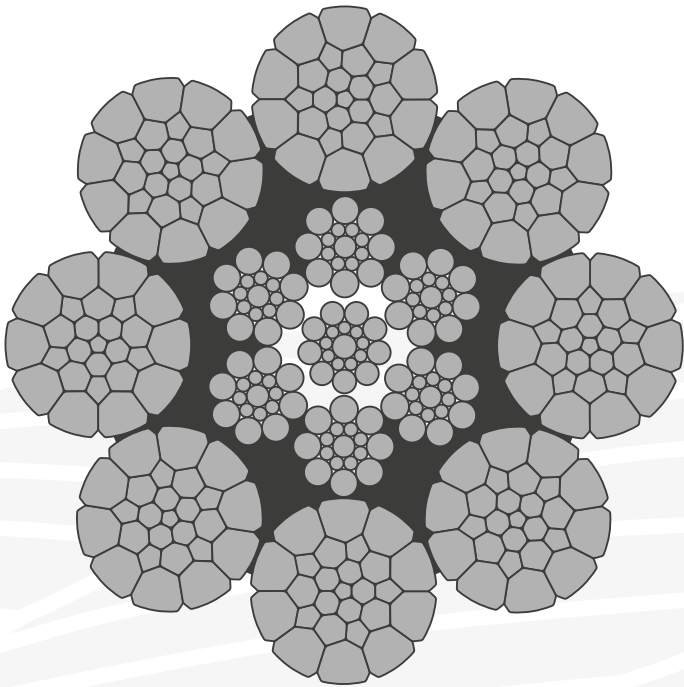
construction 8xK25F-EPIWRC	number of wires 249 / 321	load bearing outer wires 152
number of strands 8+IWRC	manufacturing tolerance +2% / +4%	available in regular lay

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load		
		1770 N/mm ² [kN]	1960 N/mm ² [kN]	2160 N/mm ² [kN]
12	67,0	119	132	145
1/2"	74,3	133	153	160
13	79,0	140	155	170
14	92,0	162	179	198
9/16"	94,0	168	193	202
15	105,0	186	206	227
5/8"	115,5	203	225	248
16	119,0	212	234	258
17	135,0	239	264	291
18	152,0	268	297	327
19	168,0	298	330	364
3/4"	168,0	298	330	364
20	187,0	331	366	403
21	207,0	365	404	446
22	227,0	400	443	488
7/8"	233,6	412	456	502
23	248,0	438	485	534
24	269,0	476	527	581
25	292,5	517	573	631
1"	300,7	538	610	639
26	316,0	558	618	682
27	341,0	603	668	736
28	366,0	648	717	791
1-1/8"	375,2	679	752	829
29	393,5	696	770	849
30	421,0	744	823	907
31	450,0	795	880	970
1-1/4"	464,0	827	930	976
32	479,0	846	937	1.032
33	510,0	901	997	1.099
34	541,0	955	1.058	1.166
1-3/8"	563,0	984	1.129	1.184
35	573,5	1.013	1.122	1.236
36	606,0	1.071	1.186	1.307

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

APPLICATION INFORMATION

breaking strength	●●●●○	rotation resistant	no
bending performance	●●●●○	use with swivel	no
drum crush resistance	●●●●○	rec. max fleet angle	4,0°
abrasion resistance	●●●●○	multi layer suited	yes
lateral pressure stability	●●●●○		



ROPE CHARACTERISTICS

Super 8 C is the classic upgrade rope for most crane types for increased rope service life performance while maintaining the ability to operate with fleet angles up to 4°. The 8-strand construction provides an excellent combination of flexibility, fatigue life, and abrasion resistance.

The rope is available in dual-tensile strength by which the outer strand wires are made from a higher fatigue resistant steel (on request). Suited as hoist line in systems using a left and right handed rope and in multi-fall applications with low lifting heights.

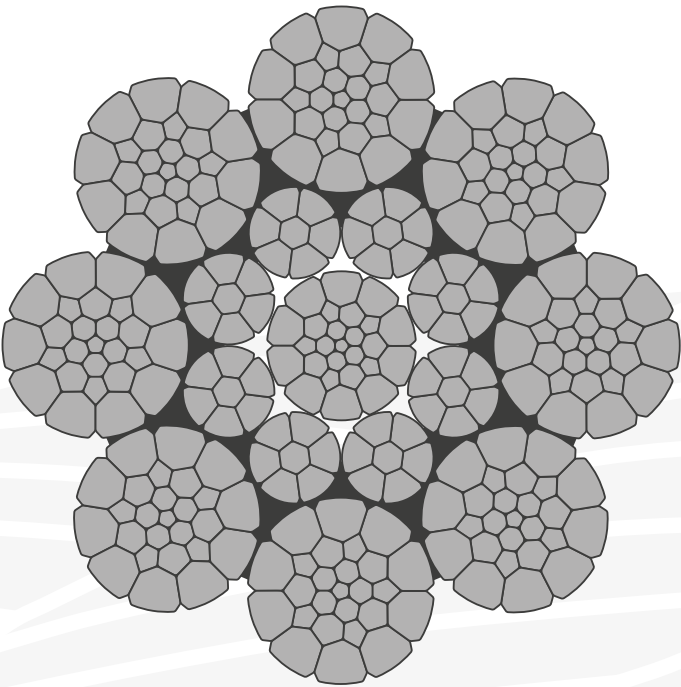
construction	number of wires	load bearing outer wires
10-40mm: 8xK26WS-EPIWRC	257 / 329	208
41-55mm: 8xK31WS-EPIWRC	369	248
56-65mm: 8xK36WS-EPIWRC	409	288
66+ mm: 8xK41WS-EPIWRC	449	328
number of strands	manufacturing tolerance	available in
8+IWRC	+2% / +4%	regular- / lang lay

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load		
		1770 N/mm² [kN]	1960 N/mm² [kN]	2160 N/mm² [kN]
12	63,5	113	129	132
1/2"	69,8	124	141	145
13	74,0	131	150	153
14	86,7	154	175	180
9/16"	88,3	157	179	184
15	98,0	176	200	205
5/8"	109,0	195	221	227
16	114,1	203	231	237
17	126,8	226	257	263
18	142,4	255	290	297
19	157,5	282	321	329
3/4"	157,5	282	321	329
20	175,7	314	357	366
21	194,5	348	396	405
22	213,2	382	434	445
7/8"	213,7	386	439	449
23	232,2	416	473	485
24	251,1	450	512	525
25	272,4	489	556	570
1"	282,7	499	574	581
26	293,7	527	600	615
27	318,7	573	651	667
28	343,7	618	703	720
1-1/8"	359,4	636	730	739
29	367,6	660	751	769
30	391,5	702	798	818
31	421,3	756	860	881
1-1/4"	442,6	778	898	909
32	451,0	810	921	944
33	479,9	859	977	1.001
34	508,7	908	1.033	1.058
1-3/8"	535,3	935	1.068	1.100
35	538,7	964	1.096	1.123
36	568,7	1.020	1.160	1.188
38	634,0	1.132	1.287	1.319
1-1/2"	641,4	1.133	1.289	1.320
40	700,4	1.257	1.430	1.465
1-5/8"	739,8	1.328	1.510	1.547
42	769,1	1.381	1.571	1.609
44	847,2	1.514	1.722	1.764
1-3/4"	877,4	1.567	1.783	1.826
46	929,3	1.659	1.888	1.934
1-7/8"	982,7	1.757	1.995	2.044
48	1.010,1	1.807	2.049	2.100

NON - ROTATION RESISTANT

APPLICATION INFORMATION

breaking strength	●●●●●	rotation resistant	no
bending performance	●●●●○	use with swivel	no
drum crush resistance	●●●●○	rec. max fleet angle	3,0°
abrasion resistance	●●●●○	multi layer suited	yes
lateral pressure stability	●●●●○		



ROPE CHARACTERISTICS

Boasting with breakload and fatigue life, Super 8 CD is suited as hoist and luffing rope in applications with extreme breakload requirements. Suited as hoist line in systems using a left and right handed rope and in multi-fall applications with low lifting heights.

construction	number of wires	load bearing outer wires
10-40mm: 8xK26WS-EPPWRC(K)	290	208
41-55mm: 8xK31WS-EPPWRC(K)	335	248
56-65mm: 8xK36WS-EPPWRC(K)	444	288
66+ mm: 8xK41WS-EPPWRC(K)	505	328
number of strands	manufacturing tolerance	available in
8+IWRC	+2% / +4%	regular- / lang lay

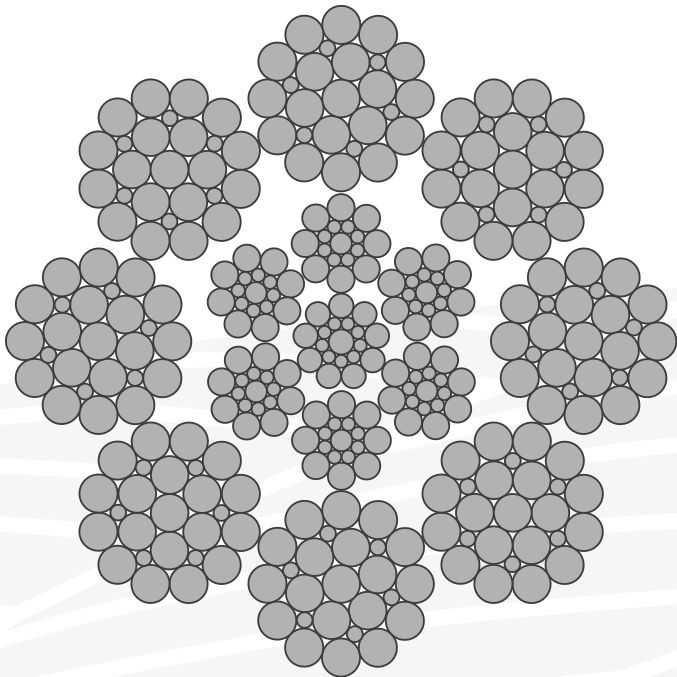
Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load		
		1770 N/mm ² [kN]	1960 N/mm ² [kN]	2160 N/mm ² [kN]
18	159,3	270	300	330
19	174,0	296	327	361
3/4"	174,0	296	327	361
20	192,9	328	363	400
21	214,8	365	404	445
22	235,4	400	443	488
7/8"	243,0	400	443	488
23	257,2	437	484	533
24	281,8	479	530	584
25	304,9	518	573	632
1"	317,0	539	596	657
26	328,5	558	618	681
27	352,0	598	662	730
28	384,9	654	724	798
1-1/8"	396,0	672	745	821
29	407,9	693	767	845
30	435,7	740	819	903
31	470,7	799	885	975
1-1/4"	500,3	850	941	1.037
32	500,3	850	941	1.037
33	528,8	898	995	1.096
34	559,8	951	1.053	1.160
1-3/8"	596,3	1.013	1.122	1.236
35	596,3	1.013	1.122	1.236
36	630,0	1.070	1.185	1.306
38	709,4	1.205	1.334	1.470
1-1/2"	709,4	1.205	1.334	1.470
40	778,4	1.322	1.464	1.613
1-5/8"	820,6	1.394	1.544	1.702
42	865,8	1.471	1.628	1.795
44	940,6	1.597	1.769	1.949
1-3/4"	950,6	1.614	1.787	1.969
46	1.033,3	1.755	1.943	2.142
1-7/8"	1.109,8	1.885	2.087	2.300
48	1.118,4	1.899	2.103	2.318
50	1.222,3	2.076	2.299	2.533
2"	1.265,0	2.142	2.372	2.614
52	1.312,2	2.229	2.468	2.720

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

PYTHON FLAMESHIELD 8

APPLICATION INFORMATION

breaking strength	●●●○○	rotation resistant	no
bending performance	●●●●●	use with swivel	no
drum crush resistance	N/A	rec. max fleet angle	4,0°
abrasion resistance	●●●○○	multi layer suited	no
lateral pressure stability	N/A		



NON - ROTATION RESISTANT

ROPE CHARACTERISTICS

Flameshield 8 is particularly designed for hot shop cranes. Where standard rope wires would develop premature brittleness caused by excessive temperatures, Flameshield 8 goes the extra mile. A very flexible construction ensures a long rope core life. Suited as hoist line in systems using a left and right handed rope.

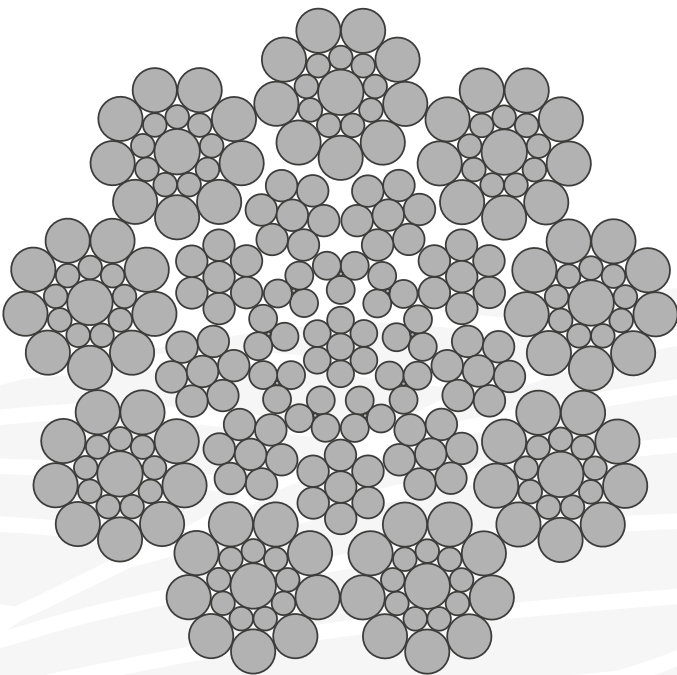
construction 8x25F-1WRC	number of wires 321	load bearing outer wires 152
number of strands 8+1WRC	manufacturing tolerance +2% / +4%	available in regular- / lang lay

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1770 N/mm ² [kN]	1960 N/mm ² [kN]
20	172,0	281	311
21	190,5	311	344
22	209,0	340	377
7/8"	216,1	352	390
23	228,5	373	413
24	248,0	405	448
25	269,5	440	487
1"	279,1	456	505
26	291,0	475	526
27	314,5	513	568
28	338,0	551	610
1-1/8"	351,4	571	634
29	363,0	592	655
30	388,0	633	701
31	414,5	676	749
1-1/4"	431,8	705	780
32	441,0	720	797
33	469,5	766	848
34	498,0	813	900
1-3/8"	519,4	847	927
35	528,0	862	954
36	558,0	911	1.009
38	622,0	1.015	1.124
1-1/2"	640,5	1.045	1.157
40	689,0	1.125	1.245
1-5/8"	729,4	1.191	1.318
42	760,0	1.240	1.373
44	834,0	1.361	1.507
1-3/4"	862,3	1.407	1.558
46	912,0	1.487	1.647
1-7/8"	965,5	1.574	1.743
48	993,0	1.619	1.793

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

APPLICATION INFORMATION

breaking strength	●●●●○	rotation resistant	no
bending performance	●●●●●	use with swivel	no
drum crush resistance	N/A	rec. max fleet angle	2,0°
abrasion resistance	●●●●○	multi layer suited	no
lateral pressure stability	N/A		



ROPE CHARACTERISTICS

High strength yet super flexible overhead crane wire rope. Used as original equipment rope and for crane capacity upgrades. Also used as high strength engineered assembly cable for tension applications.

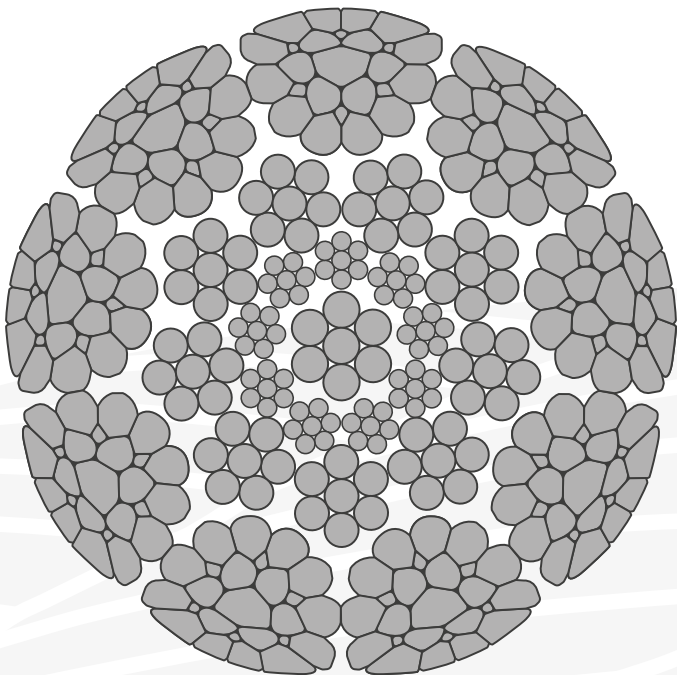
construction 10-22mm: 9x19S-PWRC 23-48mm: 9x25F-PWRC	number of wires 268 358	load bearing outer wires 171 171
number of strands 9+PWRC	manufacturing tolerance +2% / +4%	available in regular lay

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1960 N/mm ² [kN]	2160 N/mm ² [kN]
10	49,0	89	98
11	59,0	108	119
7/16"	65,7	108	119
12	71,0	128	141
1/2"	75,1	144	151
13	83,0	150	166
14	96,0	174	192
9/16"	101,4	182	203
15	110,0	200	221
5/8"	112,6	227	241
16	126,0	228	251
17	142,0	257	283
18	159,0	288	318
19	177,0	321	354
3/4"	178,8	324	358
20	196,0	356	392
21	215,0	397	438
22	234,0	438	483
7/8"	236,3	445	488
23	256,5	480	529
24	279,0	522	575
25	303,0	567	625
1"	301,9	609	671
26	327,0	612	675
27	353,0	661	729
28	379,0	710	782
1-1/8"	385,4	740	815
29	407,5	762	840
30	436,0	815	898
31	466,0	871	960
1-1/4"	473,7	906	998
32	496,0	927	1.022
33	528,0	987	1.088
34	560,0	1.047	1.154
1-3/8"	572,5	1.076	1.185
35	593,5	1.110	1.224
36	627,0	1.174	1.294
38	699,0	1.308	1.441
1-1/2"	700,8	1.374	1.542
40	774,0	1.449	1.597
1-5/8"	819,6	1.534	1.690
42	854,0	1.598	1.761
44	937,0	1.753	1.932
1-3/4"	946,6	1.771	1.952
46	1.024,0	1.916	2.112
1-7/8"	1.083,8	2.028	2.235
48	1.115,0	2.087	2.299

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

APPLICATION INFORMATION

breaking strength	●●●●○	rotation resistant	no
bending performance	●●●○	use with swivel	no
drum crush resistance	●●●○	rec. max fleet angle	2,0°
abrasion resistance	●●●●○	multi layer suited	yes
lateral pressure stability	●●●●●		



Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1960 N/mm ² [kN]	2160 N/mm ² [kN]
12	77,0	139	153
1/2"	77,4	157	164
13	90,0	163	180
14	104,0	189	209
9/16"	106,1	198	211
15	120,0	217	240
5/8"	121,2	245	257
16	136,0	247	273
17	154,0	279	308
18	173,0	313	345
19	192,0	349	384
3/4"	192,5	354	388
20	213,0	387	426
21	232,0	427	471
22	251,0	468	515
7/8"	253,6	491	541
23	274,5	512	564
24	298,0	557	613
25	324,0	605	667
1"	329,2	649	680
26	350,0	653	720
27	378,0	705	777
28	406,0	758	835
1-1/8"	408,7	828	868
29	436,0	814	897
30	466,0	870	958
31	498,0	930	1.024
1-1/4"	510,9	959	1.057
32	530,0	990	1.090

ROPE CHARACTERISTICS

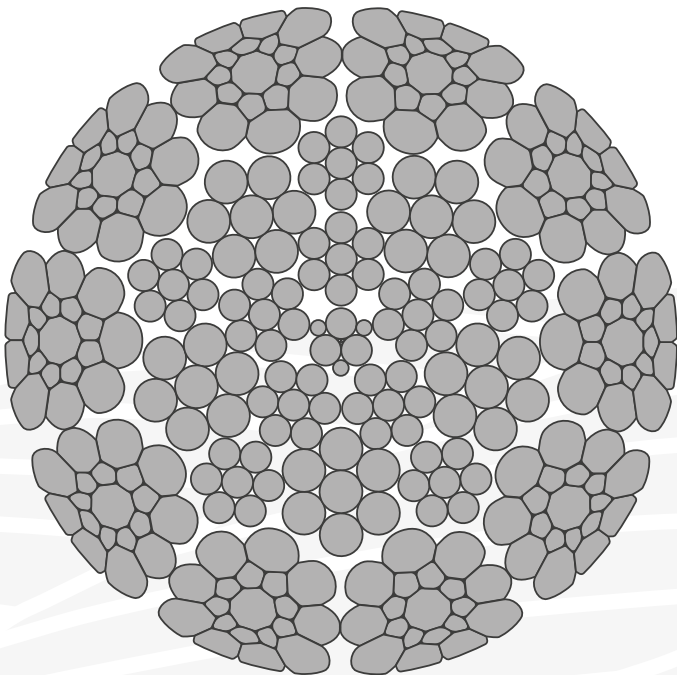
Very high strength yet super flexible overhead crane wire rope. Used as original equipment rope and for crane capacity upgrades. Also used as high strength engineered assembly cable for tension applications. Power 9 S is ForcePac compacted to enhance the abrasion characteristic and to reduce sheave- and drum wear.

construction 10-22mm: 9xK19S-PWRC 23-32mm: 9xK25F-PWRC	number of wires 268 358	load bearing outer wires 171 171
number of strands 9+PWRC	manufacturing tolerance +2% / +4%	available in regular lay

NON - ROTATION RESISTANT

APPLICATION INFORMATION

breaking strength	●●●●●	rotation resistant	no
bending performance	●●●○○	use with swivel	no
drum crush resistance	●●●○○	rec. max fleet angle	2,0°
abrasion resistance	●●●○○	multi layer suited	yes
lateral pressure stability	●●●●●		



FORCEPAC



LONGLIFE

ROPE CHARACTERISTICS

Super high strength wire rope mainly used for engineered cable assemblies, counterweight ropes, winch lines, boom pendants, extension- and retraction cables, etc. Ultra S is ForcePac compacted to enhance the abrasion characteristic and to reduce sheave- and drum wear.

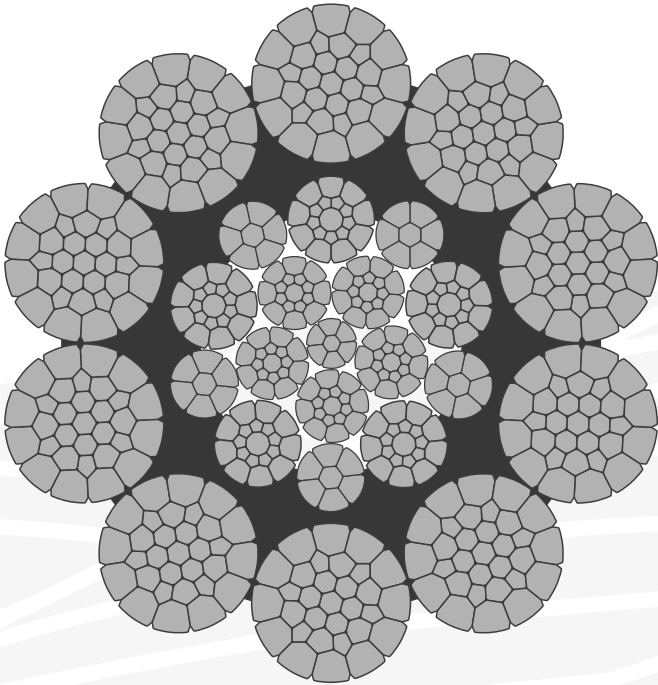
construction 10-20mm: 10xK19S-PWRC 21-32mm: 10xK25F-PWRC	number of wires 301 362	load bearing outer wires 190 190
number of strands 10+PWRC	manufacturing tolerance +2% / +4%	available in regular lay

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1960 N/mm ² [kN]	2160 N/mm ² [kN]
12	78,0	143	161
1/2"	82,8	166	180
13	91,0	168	190
14	106,0	194	221
9/16"	108,2	208	226
15	122,0	223	253
5/8"	129,4	236	281
16	138,0	254	288
17	156,0	287	325
18	175,0	321	361
19	195,0	358	403
3/4"	186,3	358	403
20	216,0	397	446
21	236,5	438	495
22	257,0	480	545
7/8"	259,7	486	555
23	281,5	526	589
24	306,0	571	633
25	333,0	620	688
1"	334,1	646	736
26	360,0	670	743
27	388,5	724	782
28	417,0	778	857
1-1/8"	417,7	808	900
29	448,0	835	920
30	479,0	893	984
31	512,0	954	1.051
1-1/4"	518,6	1.009	1.110
32	545,0	1.016	1.119

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

APPLICATION INFORMATION

breaking strength	●●●●●	rotation resistant	no
bending performance	●●●●○	use with swivel	no
drum crush resistance	●●●○○	rec. max fleet angle	4,0°
abrasion resistance	●●●●○	multi layer suited	yes
lateral pressure stability	●●●●○		



HIPAC



PLASTGUARD

ROPE CHARACTERISTICS

The luffing rope for extreme breakload requirements including, but not limited to, dredging lines and in general offshore winch applications. Suited as hoist line in systems using a left and right handed rope and in multi-fall applications with low lifting heights.

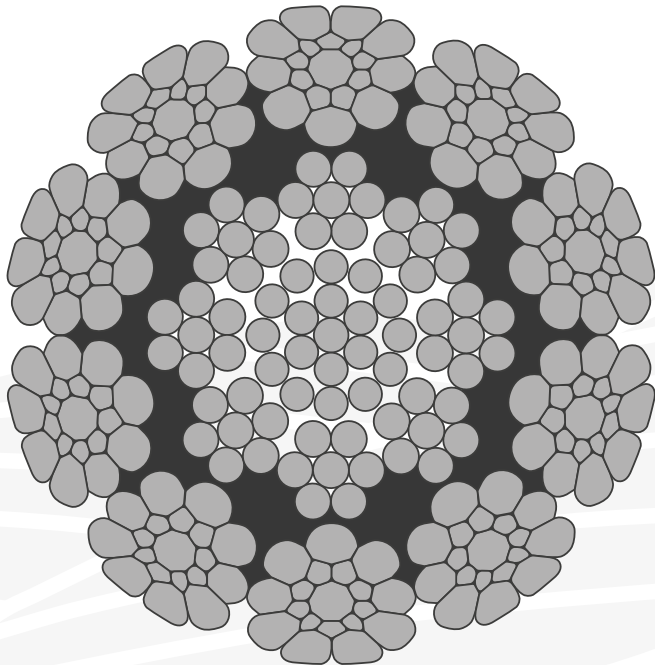
construction 10xK31WS-EPIWRC(K)	number of wires 522	load bearing outer wires 310
number of strands 10+IWRC	manufacturing tolerance +2% / +4%	available in regular- / lang lay

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1960 N/mm ² [kN]	2160 N/mm ² [kN]
1"	318,0	598	659
26	327,0	614	676
27	346,0	651	717
28	372,1	699	771
1-1/8"	389,0	731	806
29	399,7	751	828
30	432,2	812	895
31	460,9	866	955
1-1/4"	490,5	922	1.016
32	490,5	922	1.016
33	522,6	982	1.082
34	554,6	1.042	1.149
1-3/8"	587,3	1.104	1.216
35	587,3	1.104	1.216
36	618,8	1.163	1.282
38	689,8	1.296	1.429
1-1/2"	689,8	1.296	1.429
40	764,3	1.436	1.583
1-5/8"	808,0	1.519	1.674
42	848,1	1.594	1.757
44	922,1	1.733	1.910
1-3/4"	931,5	1.764	1.944
46	1.010,1	1.899	2.092
1-7/8"	1.080,0	2.030	2.238
48	1.105,2	2.077	2.289
50	1.198,6	2.253	2.483
2"	1.241,7	2.341	2.580
52	1294,6	2.433	2.681
2-1/8"	1.394,8	2.622	2.890
54	1.395,3	2.622	2.890
56	1.495,0	2.810	3.096
2-1/4"	1.554,5	2.922	3.220
58	1.601,2	3.009	3.316
60	1.717,3	3.228	3.557
2-3/8"	1.720,0	3.228	3.557
62	1.833,1	3.445	3.797
2-1/2"	1.920,0	3.614	3.983
64	1.958,3	3.680	4.056
66	2.091,4	3.931	4.332
2-5/8"	2.147,6	4.036	4.448
68	2.213,6	4.160	4.585
2-3/4"	2.342,9	4.403	4.853
70	2.342,9	4.403	4.853
72	2.472,9	4.648	5.122
2-7/8"	2.543,7	4.781	5.269
74	2.607,1	4.900	5.400
76	2.764,1	5.195	5.725

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

APPLICATION INFORMATION

breaking strength	●●●○○	rotation resistant	no
bending performance	●●●●●	use with swivel	no
drum crush resistance	N/A	rec. max fleet angle	4,0°
abrasion resistance	●●●○○	multi layer suited	no
lateral pressure stability	N/A		



ROPE CHARACTERISTICS

10-strand high performance wire rope for overhead cranes as well as some truck- and container cranes. Special spin-resistant feature prevents much of the unwanted block twisting on overhead cranes. The PlastGuard core protection prevents metal to metal contact between inner- and outer strands and greatly reduces internal, undetectable, wear and abrasion. Also, the core is twisted in the opposite direction of the outer strands making this rope spin-resistant and therefore ideal for cranes where both rope ends are attached to the drum.

Multi is a medium ForcePac'd rope to reduce initial rope stretch and to increase the outer strand contact area to sheaves and drum. 10 outer strands distribute the load pressures more equally thus reducing wear of the rope and your equipment.

construction 10xK19S-EPIWRC	number of wires 265	load bearing outer wires 190
number of strands 10+IWRC	manufacturing tolerance +2% / +4%	available in regular- / lang lay

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1960 N/mm ² [kN]	2160 N/mm ² [kN]
13	75,0	128	141
14	87,0	148	163
9/16"	92,2	165	173
15	100,0	170	188
5/8"	107,0	192	212
16	114,0	194	213
17	129,0	219	241
18	144,0	245	270
19	161,0	273	301
3/4"	161,4	293	307
20	178,0	303	334
21	196,5	334	369
22	215,0	366	404
7/8"	217,2	385	424
23	235,5	401	442
24	256,0	436	480
25	278,5	474	522
1"	283,0	504	554
26	301,0	511	564
27	325,0	552	609
28	349,0	593	654
1-1/8"	351,2	637	702
29	375,0	637	702
30	401,0	681	750
31	428,5	728	802
1-1/4"	433,4	775	854
32	456,0	781	861
33	485,0	825	909
34	514,0	875	964
1-3/8"	525,4	928	1.022
35	545,5	952	1.050
36	577,0	981	1.081
38	643,0	1.093	1.204
1-1/2"	644,7	1.193	1.251
40	712,0	1.211	1.334
1-5/8"	753,6	1.281	1.412
42	785,0	1.335	1.471
44	862,0	1.465	1.614

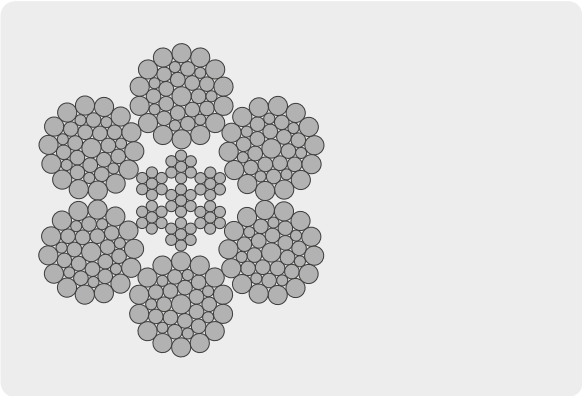
HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

NON - ROTATION RESISTANT

COMPLEMENTARY ROPE CONSTRUCTIONS

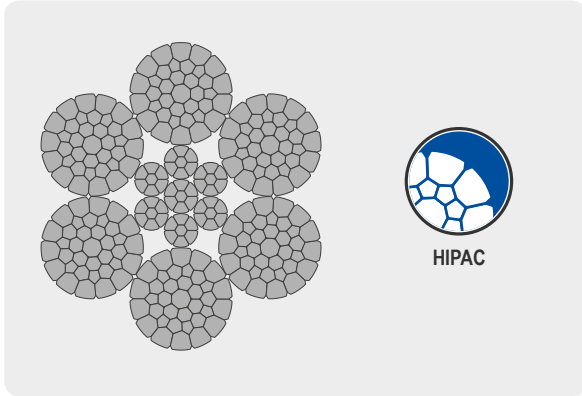
PYTHON SOLID 6 R

Premium quality uncompacted six strand rope in various designs (6x19S, 6x26WS, 6x36WS etc.) for single layer applications. Perfectly suited for mining and drilling applications.



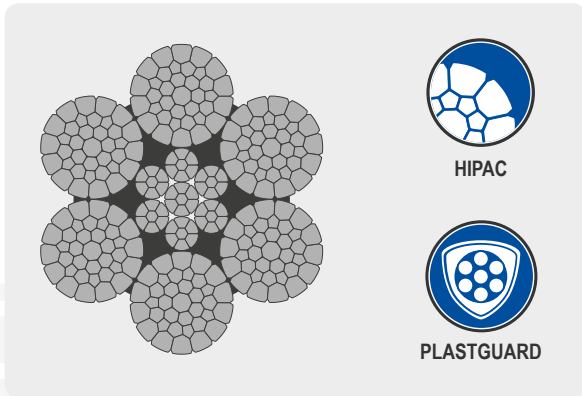
PYTHON SOLID 6 C

HiPac enabled version of Solid 6 R. Provides increased breakload and superior crush resistance. Suited for multi layer spooling.



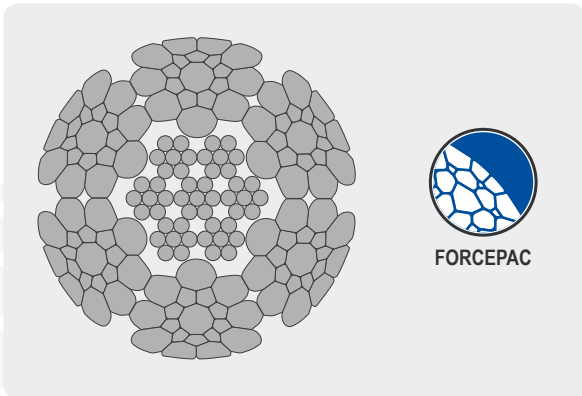
PYTHON SUPER 6 C

Highly robust allrounder. Features HiPac compaction for increased breakload and superior crush resistance plus PlastGuard protection for extended service life. Outperforms standard API drill lines by more than 50%. Suited for multi layer spooling.



PYTHON 6 SV

Very robust rope for environmentally harsh conditions such as draglines or tractor / skidder winches for stony ground. Thick outer wires in combination with the ForcePac compaction provide excellent abrasion resistance.



Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1960 N/mm ² [kN]	2160 N/mm ² [kN]
1"	270,0	480	528
26	282,4	499	550
27	302,6	535	590
28	318,1	562	620
1-1/8"	330,0	583	643
29	340,5	602	663
30	373,8	661	728
31	399,8	707	779
1-1/4"	420,0	742	817
32	423,0	748	824
33	450,6	797	878
34	478,7	846	933
1-3/8"	506,0	894	986
35	506,9	896	988
36	534,4	945	1.041
38	609,0	1.077	1.187
1-1/2"	610,0	1.080	1.190
40	668,0	1.181	1.302
1-5/8"	697,0	1.231	1.357
42	721,0	1.274	1.404
44	807,0	1.427	1.573
1-3/4"	825,0	1.459	1.608
46	880,0	1.556	1.715

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1960 N/mm ² [kN]	2160 N/mm ² [kN]
1"	289,0	523	577
26	301,0	544	600
27	328,3	594	654
28	351,0	635	700
1-1/8"	362,0	655	722
29	371,4	672	740
30	403,0	729	803
31	428,1	774	853
1-1/4"	451,0	816	900
32	455,3	823	907
33	483,0	873	963
34	517,0	935	1.030
1-3/8"	545,0	985	1.086
35	545,9	987	1.088
36	579,8	1.049	1.156
38	642,0	1.161	1.280
1-1/2"	644,0	1.164	1.283
40	714,0	1.291	1.423
1-5/8"	759,0	1.372	1.512
42	789,0	1.426	1.572
44	863,0	1.561	1.721
1-3/4"	879,0	1.591	1.754
46	947,0	1.712	1.887

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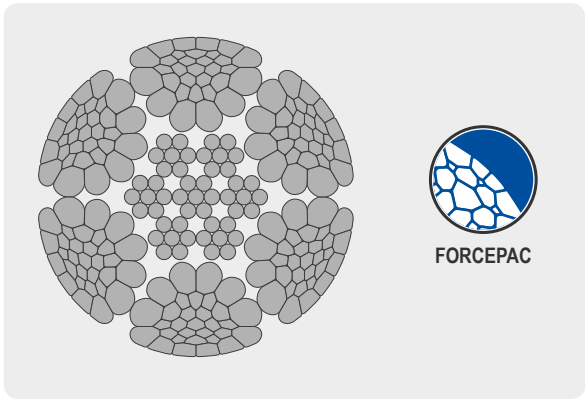
Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load
		1960 N/mm ² [kN]
7	23,0	50
5/16"	36,7	67
8	37,0	67
9	45,0	82
3/8"	49,7	90
10	54,0	98
11	64,0	116
7/16"	64,6	117
12	74,0	138
1/2"	81,3	152
13	86,0	161
14	98,0	175
9/16"	100,0	179
15	112,0	200
5/8"	121,8	223
16	126,0	235
18	156,0	280
19	173,0	306
3/4"	173,4	307
20	190,0	346
22	226,0	431
7/8"	228,4	436
24	267,0	473

HIGHER DIAMETERS AND BREAKING LOADS ON REQUEST

COMPLEMENTARY ROPE CONSTRUCTIONS

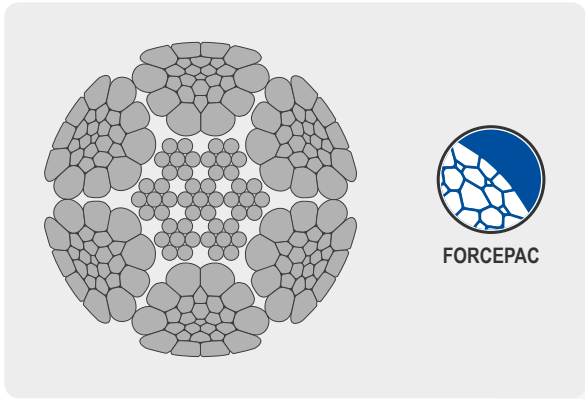
PYTHON 6 WSV

Highly flexible ForcePac compacted rope for use in applications with increased bending fatigue requirements over 6 SV. Perfectly suited as tubing line and boom hoist line on a crawler crane.



PYTHON 6 R+F

Versatile six strand ForcePac compacted rope with a very round surface and optimized bending / abrasion performance. Applicable as all purpose logging rope, climbing rope for snow groomers, flying fox rope in high rope courses and many other applications.

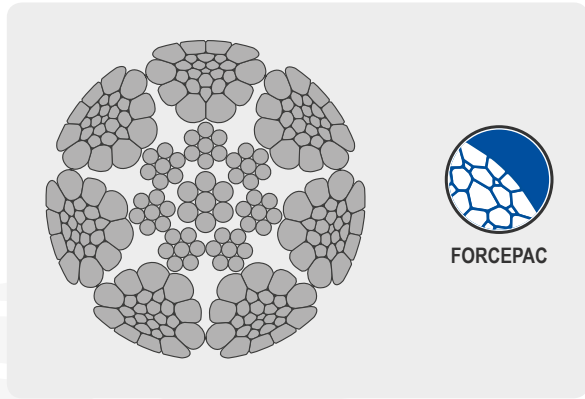


Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load
		1960 N/mm ² [kN]
10	55,4	96
11	65,5	121
7/16"	66,2	122
12	76,4	132
1/2"	83,6	147
13	88,1	157
14	101,0	189
9/16"	103,0	193
15	114,0	204
5/8"	127,9	239
16	129,0	241
18	159,0	290
19	185,0	334
3/4"	185,5	335
20	193,0	346
22	231,0	440
7/8"	233,4	445
1"	320,4	534
26	328,0	547
28	353,0	674
1-1/8"	360,2	688
30	415,0	803
1-1/4"	460,0	819

Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load
		1960 N/mm ² [kN]
8	37,0	68
9	46,0	83
3/8"	50,7	91
10	55,0	99
11	65,0	122
7/16"	65,6	123
12	76,0	141
1/2"	83,3	154
13	88,0	163
14	101,0	186
9/16"	105,9	195
15	114,0	211
5/8"	124,4	229
16	129,0	237
18	159,0	295
19	176,0	316
3/4"	176,5	317
20	193,0	353
22	231,0	423
7/8"	233,4	427
24	272,0	487

PYTHON 7 R+F

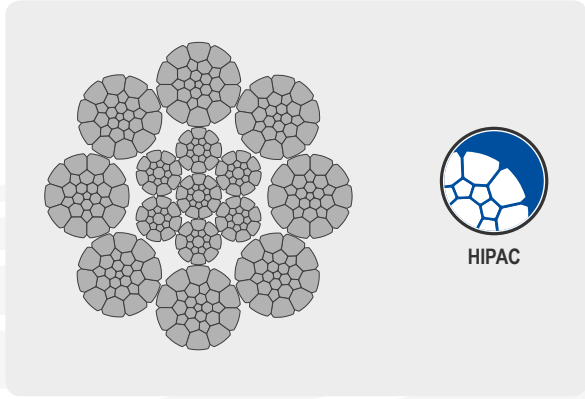
7 R+F is PYTHON's specifically designed premium quality carrying rope for skyline yarders. The increased contact surface provides much smoother carriage performance and increased braking grip.



Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load
		1960 N/mm ² [kN]
16	124,0	259
18	160,0	331
20	195,0	404
22	236,0	507

PYTHON SOLID 8 C

Premium eight strand rope for increased breakload requirements and service life over six strand constructions. Its HiPac compaction and a very tight rope geometry makes it the ideal winch rope and boom hoist line for multi layer winches.



Nominal diameter [mm/inch]	Mass weight [kg/100m]	Minimum breaking load	
		1960 N/mm ² [kN]	2160 N/mm ² [kN]
1"	293,0	525	579
26	310,0	555	612
27	333,0	597	658
28	364,0	652	719
1-1/8"	375,0	673	742
29	385,3	691	762
30	411,4	738	814
31	445,6	799	881
1-1/4"	467,0	838	924
32	470,8	845	931
33	500,8	899	990
34	528,7	949	1.045
1-3/8"	564,0	1.012	1.115
35	564,9	1.014	1.117
36	595,0	1.068	1.176
38	670,0	1.202	1.324
1-1/2"	672,0	1.205	1.327
40	736,0	1.321	1.456
1-5/8"	783,0	1.405	1.548
42	814,0	1.461	1.610
44	892,0	1.600	1.764
1-3/4"	910,0	1.633	1.800
46	969,0	1.737	1.914



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