



# CRANE ROPES



 **usha martin**





commitment to quality and product development which has been driven by a dynamic and technically demanding marketplace.

Usha Martin Wire Ropes & Speciality Products Division is an integral part of the globally acclaimed Usha Martin Group, active in High Carbon, Alloy & Speciality Steel, Telecom Cables & Software, Oil Drilling Services and Worldwide distribution of its products. The global success of Usha Martin Powerform® compacted crane rope and Hyflex non compacted crane rope is based on an uncompromising

State of the art ISO 9001/9002 certified manufacturing facilities and tight process control from steelmaking to rod manufacture and through to finished wire rope ensure consistently high quality in the finished crane rope. All Usha Martin crane ropes are supported by an expanding global distribution network which can offer expert advice to both crane manufacturers and operators.

The wire ropes shown in this catalogue are "standard products". Usha Martin has the capability to design and manufacture according to individual customer requirements.



Test house approved by Lloyd Register of Shipping






















Licensed under API Spec 9A



Test house approved by American bureau of Shipping



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# QUALITY GUARANTEE

**Guaranteed Raw Material Quality** - Good raw material input at the beginning of the ropemaking process combined with tight process control ensure consistently high quality in the finished rope. Usha Martin manufacture steel and rod to International standards and to even more exacting internal standards through its mini blast furnace - arc furnace - ladle furnace - vacuum degassing electromagnetic stirring - continuous casting route.

A close and unique co-operation between company owned ISO 9001/9002 certified steelmaking, rod manufacturing and wire drawing facilities guarantee production feed materials which are "tailor made" to attain the required properties of ductility and tensile strength which are essential in the finished rope.

**Guaranteed Breaking Force** - As well as operating a rigorous programme of testing throughout the production process Usha Martin confirm the minimum breaking force of each and every finished rope with an actual test to destruction.

The test certificate which is supplied with every rope will indicate a minimum guaranteed breaking force and the actual breaking force at which the test sample broke.

The Usha Martin testing facility is approved by Lloyds Register of Shipping and The American Bureau of Shipping.

**Guaranteed Quality Systems** - Certification to ISO 9001 requires that Usha Martin document all work procedures, processes and related activities covering design, development, production, shipping and commercial activity.

ISO 9001 is our customer's guarantee that we will do exactly what we say we are going to do.

Wire and Wire Ropes Division at Ranchi is the first and the only one in India to receive the prestigious award for excellence in TPM from Japanese Institute of Productivity Management (JIPM).



# QUALITY GUARANTEE

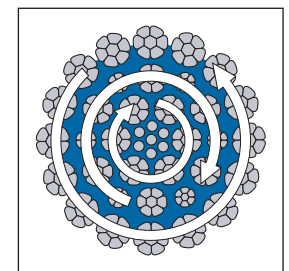
**Guaranteed Bending Fatigue Characteristics** - Bending fatigue resistance is the ability of the wire rope to withstand repeated bending over a sheave under constant or fluctuating loads.

The ability to withstand bending fatigue will, along with other factors, determine the life of the rope and is therefore of interest to both the ropemaker and the crane operator.

Usha Martin operate an ongoing fatigue testing programme which is designed to give comparative fatigue performance for various rope constructions and to provide information relative to product improvement and development. More information on fatigue testing is available on page 6.



**Guaranteed Rotational Characteristics** - Each wire rope construction will have an inherent torque characteristic where both ends of the rope are secured and an applied force will generate torque at the fixing points. Each wire rope construction will have an inherent turn characteristic where one end of the rope is free to rotate and an applied force will cause the free end of the rope to turn.



With correct rope selection these characteristics should not cause a problem in service provided the rope has been correctly "balanced" in design and manufacture.

Usha Martin operate their own Torque/Turn testing machine which is used to confirm that all rotation resistant wire ropes possess the required rotational characteristics.

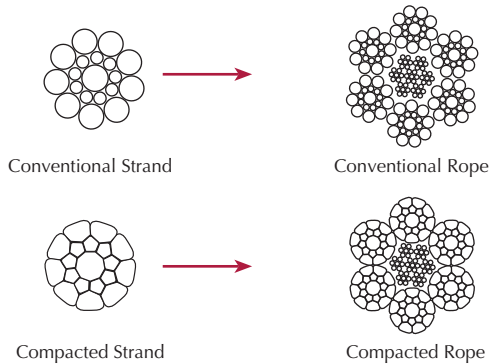
**Guaranteed Performance and Consistency** - A simple way to guarantee performance and consistency is to make sure that you are using an Usha Martin rope.

Many wire ropes available today may look similar to Usha Martin products but offer considerably less in terms of overall quality, performance, reliability and consistency. In order to protect our customers we have adopted a policy of identifying each rope with an internal marker tape.

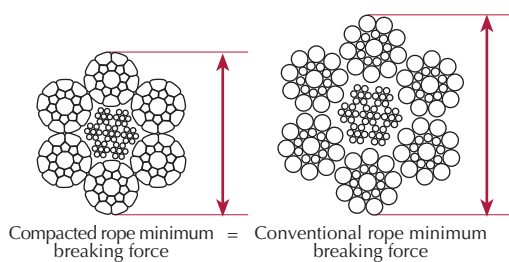


**Are you buying the "Real Thing"?**

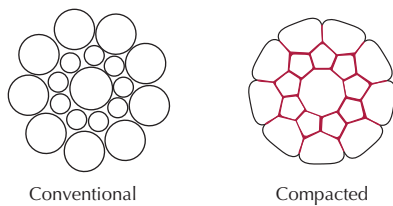
# POWERFORM<sup>®</sup> COMPACTED ROPE



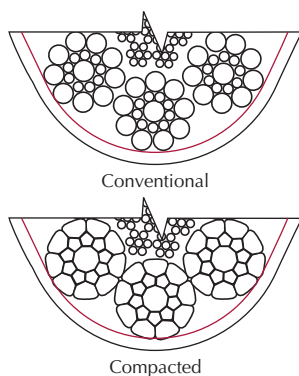
A Powerform<sup>®</sup> compacted rope is a steel wire rope which has been manufactured using individually compacted strands. During the compaction process the outside diameter of the strand is reduced and steel moves into the empty voids between the wires within the strand. The forming process also produces a very smooth exterior strand surface.



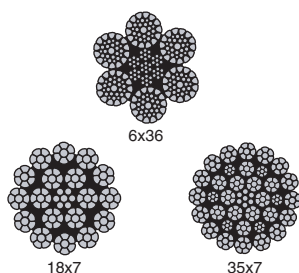
The resultant rope has a very high steel fill factor and consequently a relatively high minimum breaking force for any given diameter when compared with a conventional rope.



The compacted strand has very favourable internal contact conditions when compared with the point contact of round wires within a normal strand.

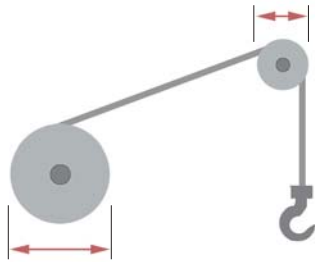


Exterior contact conditions are equally favourable. The smooth surface of the compacted rope offers a wider bearing surface to the sheave or drum groove. Inter strand contact and contact between adjacent laps of rope on the winch drum is also improved.



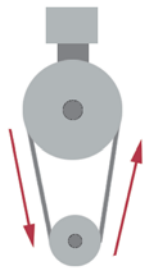
Usha Martin compacted ropes are referred to as "Powerform<sup>®</sup>" and are available in a number of constructions.

# POWERFORM<sup>®</sup> SELECTION



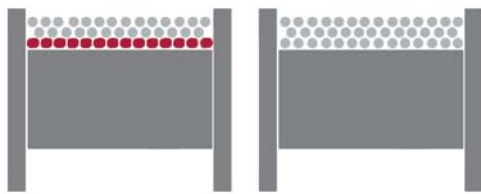
## Optimised crane design

The high breaking load to size relationship can allow crane manufacturers to optimise the design of crane components such as the winch drum and sheaves whilst still complying with international crane design standards.



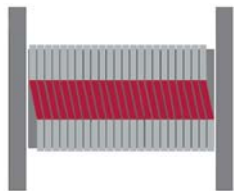
## Long life

Laboratory fatigue testing indicates that it is possible to achieve up to two times normal rope life when comparing a Powerform<sup>®</sup> rope with a conventional rope of equivalent construction.



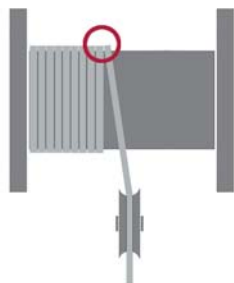
## Greater resistance to crushing in multi-layer coiling situations

Powerform<sup>®</sup> ropes are recommended for all multi-layer coiling situations where crushing on lower layers is inevitable. The more solid cross section of the Powerform<sup>®</sup> rope offers much greater resistance to this type of damage.



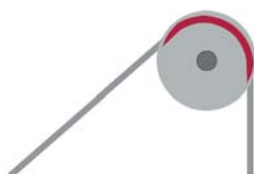
## More effective resistance to crushing at crossover points

Because of the higher steel fill factor Powerform<sup>®</sup> ropes offer much better resistance to crushing damage at crossover points on the winch drum.



## Greater resistance to "Interference" at the drum

Abrasive wear between adjacent laps of rope which is normally most severe where the rope moves on and off the drum can be minimised by using a Powerform<sup>®</sup> rope.



## Reduced wear on sheaves

The smooth exterior of the Powerform<sup>®</sup> rope can lead to reduced abrasive wear on both the sheave and rope.

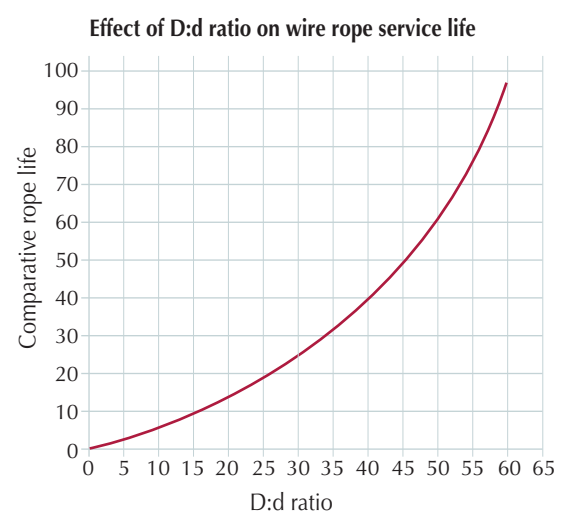
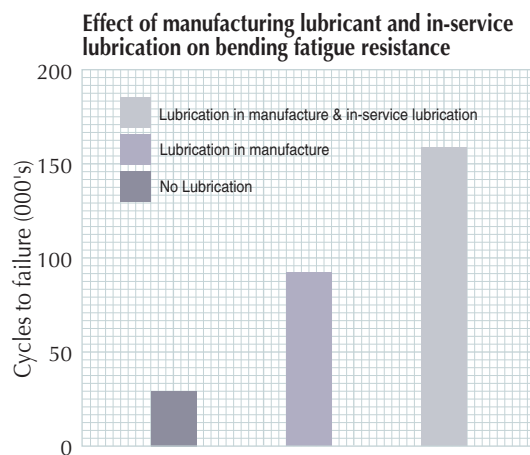
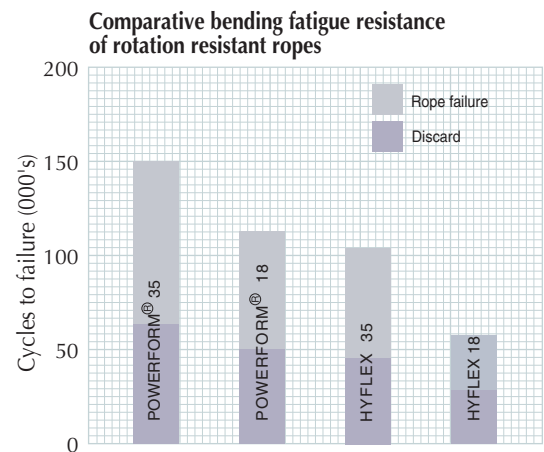
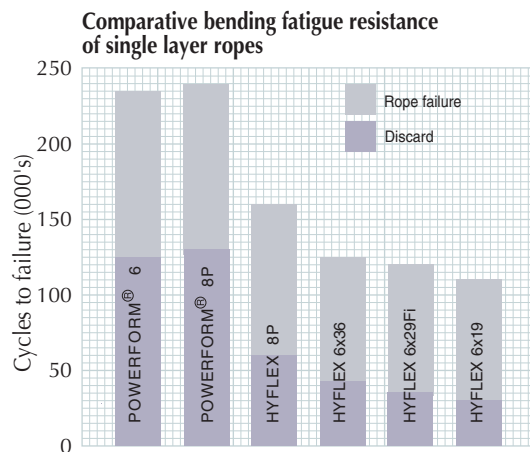
# BEND FATIGUE TESTING



Resistance to bend fatigue is a key factor in determining the service life of wire rope and is therefore of great interest to both the rope manufacturer and the crane operator. Extensive comparative bend fatigue testing is carried out at Usha Martin in order to continuously develop and improve crane rope products.

Fatigue testing involves cycling a length of rope through a sheave at a constant tension. The number of operating cycles is recorded at a point where the rope is rejectable under recommended discard levels specified under ISO 4309. The test continues until the rope under test is unable to sustain the load any longer and again the number of cycles is recorded.

Based on results obtained from an ongoing bend fatigue testing programme the following charts give an indication of the likely comparative performance which can be obtained from various rope constructions. The lower charts show the importance of lubrication in-service and the relative improvement in performance as sheave diameter (D:d ratio) increases.



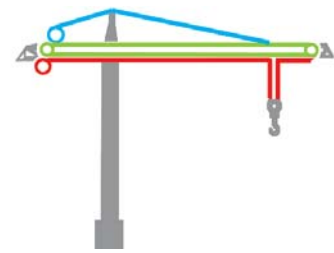


# GUIDE TO APPLICATION & ROPE DUTY

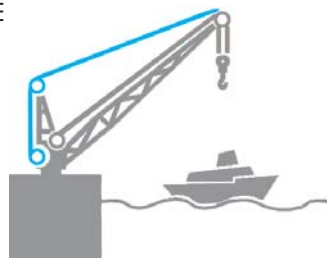
MOBILE



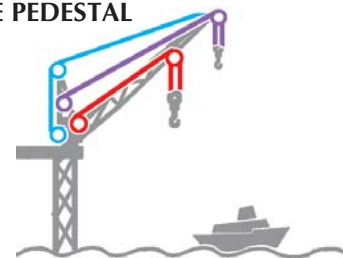
TOWER



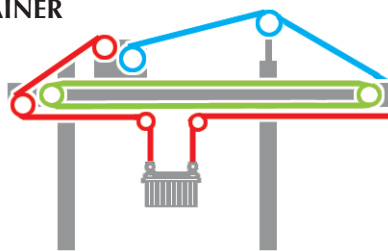
DOCKSIDE



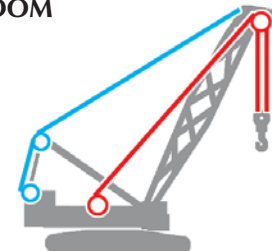
OFFSHORE PEDESTAL



CONTAINER



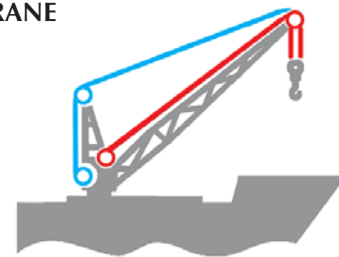
LATTICE BOOM



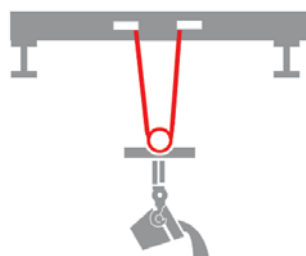
PILING



DECK CRANE



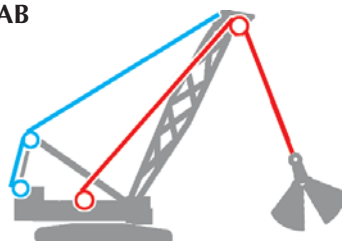
STEELWORKS LADLE



UNLOADER

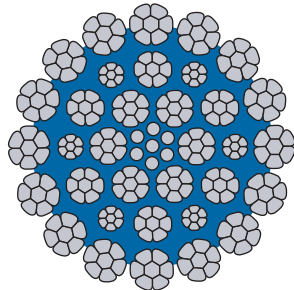


SWIMGRAB

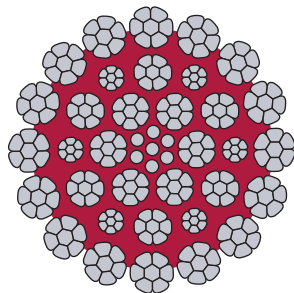


- MAIN HOIST
- BOOM HOIST
- TROLLEY/RACKING ROPE
- WHIP HOIST

# POWERFORM® 35/35P



Powerform® 35



Powerform® 35P

- Powerform® 35/35P has the highest strength of all low rotation hoist ropes.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.
- Maximum resistance to rotation.
- Suitable for use on single part and multi-part hoist reeving systems.
- High fatigue life resulting from the unique compaction process.
- Increased resistance to crushing. Recommended for multi-layer spooling operations.
- Increased abrasion resistance resulting from the unique compaction process.
- Optional plastic impregnation. (P) signifies full plastic impregnation of the Steel Core.
- Fully lubricated in manufacturing.

## Standard Characteristics Powerform® 35/35P

Construction	10mm-40mm	35xK7(16xK7:6xK7+6xK7-6xK7-1x7)	
	42mm-60mm	35xK19S(16xK19S:6xK19S+6xK19S-6xK19S-1x19S)	
Compacted	Yes	◆	
	No		
Tensile Grade N/mm <sup>2</sup>	1960	◆	
	2160		◆
Finish	Bright	◆	
	Galvanised		◆
Lay Direction	Right Hand	◆	
	Left Hand		◆
Lay Type	Ordinary		◆
	Langs		◆
Average Fill Factor (%)	74.5		
Turn value at 20% of breaking force degrees/rope lay	0.2		
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.0 x NRD		
Discard Criteria	Refer to ISO 4309:1990		

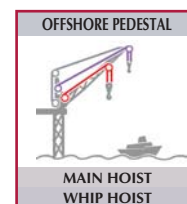
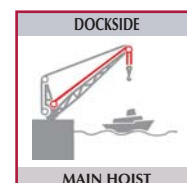
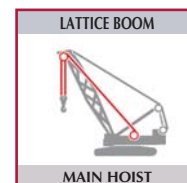
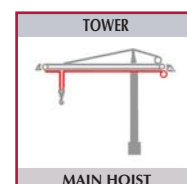
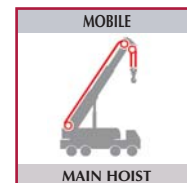


NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX.* MASS kg/100m	MINIMUM BREAKING FORCE GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1960 N/mm <sup>2</sup>		2160 N/mm <sup>2</sup>	
			kN	tonnes	kN	tonnes
	1/2	81.1	148	15.1	160	16.3
13		85.0	155	15.8	167	17.0
14		98.6	180	18.3	192	19.6
16	5/8	129	233	23.8	252	25.7
18		163	300	30.6	321	32.7
19	3/4	182	331	33.7	358	36.5
20		201	372	37.9	399	40.7
21		222	402	41.0	434	44.2
22		243	444	45.3	484	49.3
	7/8	249	453	46.2	490	49.9
24		290	531	54.1	572	58.3
	1	325	591	60.2	640	65.2
26		340	621	63.3	661	67.4
28		394	720	73.4	788	80.3
	1-1/8	411	748	76.2	810	82.6
30		453	827	84.3	904	92.2
32	1-1/4	515	944	96.2	1035	106
35	1-3/8	616	1125	115	1216	124
36		652	1185	121	1286	131
38	1-1/2	726	1326	135	1437	146
40		805	1477	151	1588	162
42		887	1485	151		
44		974	1618	165		
	1-3/4	994	1646	168		
46		1064	1765	180		
48		1159	1935	197		
50		1258	2078	212		
	2	1298	2150	219		
52		1360	2256	230		

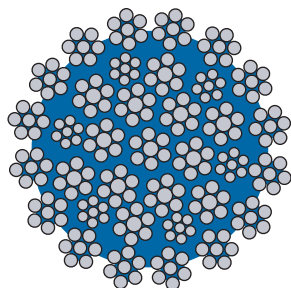
\* Mass per unit length of POWERFORM 35P increases by approx. 3%

- Note:**
- POWERFORM 35P is available on special request and prior confirmation.
  - Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.

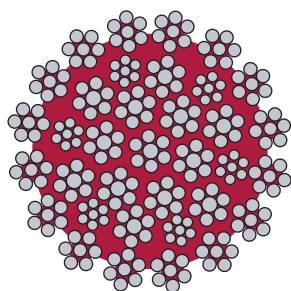
## Typical Applications



# HYFLEX 35/35P



Hyflex 35



Hyflex 35P

- Hyflex 35 is a high strength flexible hoist rope.
- Maximum resistance to rotation verified by testing on the in-house torque/turn machine.
- Suitable for use on single part and multi-part hoist reeving systems.
- Langs lay construction offers maximum resistance to wear.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.
- Optional plastic impregnation (P) signifies full plastic impregnation of the steel core.
- Fully lubricated in manufacturing.



## Standard Characteristics Hyflex 35

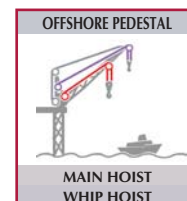
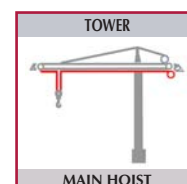
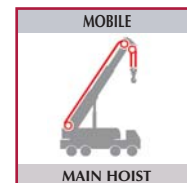
Construction	35x7(16x7:6x7+6x7-6x7-1x7)	
Compacted	Yes	No
		◆
Tensile Grade N/mm <sup>2</sup>	1960	2160
		◆
Finish	Bright	Galvanised
		◆
Lay Direction	Right Hand	Left Hand
	◆	
Lay Type	Ordinary	Langs
	◆	◆
Average Fill Factor (%)	63.5	
Turn value at 20% of breaking force degrees/rope lay	0.2	
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.0 x NRD	
Discard Criteria	Refer to ISO 4309:1990	

NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX.* MASS kg/100m	MINIMUM BREAKING FORCE GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1960 N/mm <sup>2</sup>		2160 N/mm <sup>2</sup>	
			kN	tonnes	kN	tonnes
10		44.8	76.0	7.7	86.5	8.8
11		54.2	91.0	9.3	104	10.6
12		64.5	107	10.9	125	12.7
	1/2	72.0	123	12.5	137	14.0
13		76.0	128	13.0	146	14.9
14		88.0	148	15.1	168	17.1
16	5/8	115	194	19.8	221	22.5
18		145	242	24.7	277	28.2
19	3/4	162	277	28.2	312	31.8
20		179	301	30.7	337	34.4
21		198	335	34.1	370	37.7
22		217	370	37.7	412	42.0
	7/8	221	376	38.3	418	42.6
24		258	441	45.0	498	50.8
	1	289	491	50.1	546	55.7
26		303	517	52.7	581	59.2
28		351	599	61.1	681	69.4
	1-1/8	366	621	63.3	704	71.8
30		403	679	69.2	775	79.0
32	1-1/4	459	769	78.4	865	88.2
35	1-3/8	549	945	96.3	1044	106
36		581	983	100	1085	111
38	1-1/2	647	1078	110	1205	123
40		717	1202	123	1335	136
42		790	1227	125		
44		867	1347	137		
	1-3/4	885	1375	140		
46		948	1472	150		
48		1032	1603	163		
50		1120	1740	177		
	2	1156	1796	183		
52		1211	1881	192		

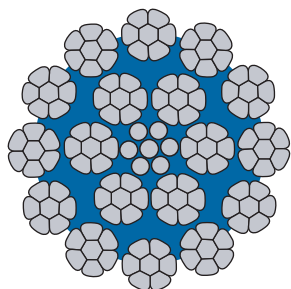
\* Mass per unit length of HYFLEX 35P increases by approx. 3%

- Note:**
- HYFLEX 35P is available on special request and prior confirmation.
  - Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.

### Typical Applications



# POWERFORM® 18



Powerform® 18

- Powerform® 18 is a high strength rotation resistant hoist rope.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.
- Good resistance to rotation verified by testing on the in-house torque/turn machine.
- Suitable for use on single part and multi-part hoist reeving systems.
- High fatigue life resulting from the unique compaction process.
- Increased resistance to crushing. Recommended for multi-layer spooling operations.
- Increased abrasion resistance resulting from the unique compaction process.
- Fully lubricated in manufacturing.

## Standard Characteristics Powerform® 18

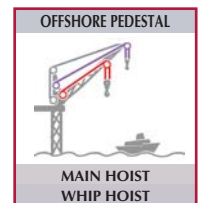
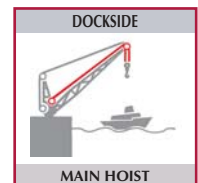
Construction	6mm-19mm	18xK7(12xK7:6xK7-1x7)
	20mm-32mm	18xK19S(12xK19S:6xK19S-1x19S)
Compacted	Yes	No
	◆	
Tensile Grade N/mm <sup>2</sup>	1960	2160
	◆	
Finish	Bright	Galvanised
		◆
Lay Direction	Right Hand	Left Hand
	◆	
Lay Type	Ordinary	Langs
		◆
Average Fill Factor (%)	66.3	
Turn value at 20% of breaking force degrees/rope lay	4	
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.25 x NRD	
Discard Criteria	Refer to ISO 4309:1990	



NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1960 N/mm <sup>2</sup>		2160 N/mm <sup>2</sup>	
			kN	tonnes	kN	tonnes
6		17.5	29.4	3.0		
7		23.8	38.0	3.9		
8		31.0	51.8	5.3		
9		39.3	64.6	6.6		
10		48.5	80.8	8.2		
11		58.7	101	10.3	111	11.3
12	1/2	69.8	116	11.8	127	12.9
		78.2	135	13.8	148	15.1
13		82.0	141	14.4	155	15.8
14		95.1	160	16.3	177	18.0
15		109	182	18.6	201	20.5
16	5/8	124	209	21.3	232	23.6
17		140	237	24.2	262	26.7
18	3/4	157	266	27.1	295	30.1
		175	291	29.7	322	32.8
20		194	320	32.6	359	36.6
22	7/8	235	379	38.6	424	43.2
		240	387	39.4	433	44.1
24	1	279	462	47.1	523	53.3
		313	517	52.7	585	59.6
26		328	542	55.2	613	62.5
28		380	632	64.4	710	72.4
30		437	721	73.5	809	82.5
32	1-1/4	497	820	83.6	920	93.8

**Note:** Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.

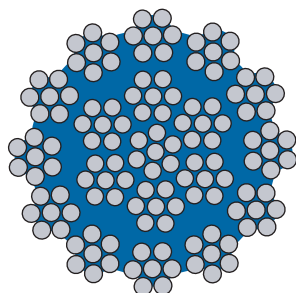
### Typical Applications



**Note :** For higher lifting heights consideration should be given to using a 35x7 construction with improved rotational characteristics.



# HYFLEX 18



Hyflex 18

- Hyflex 18 is a high quality rotation resistant hoist rope.
- Good resistance to rotation verified by testing on the in-house torque/turn machine.
- Consistent performance.
- Fully lubricated in manufacturing.
- Also available in fibre core construction.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.



## Standard Characteristics Hyflex 18

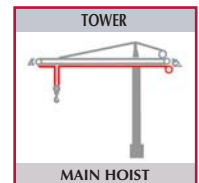
Construction	18x7(12x7:6x7-1x7)	
Compacted	Yes	No
		◆
Tensile Grade N/mm <sup>2</sup>	1960	2160
	◆	◆
Finish	Bright	Galvanised
		◆
Lay Direction	Right Hand	Left Hand
	◆	
Lay Type	Ordinary	Langs
		◆
Average Fill Factor (%)	61.5	
Turn value at 20% of breaking force degrees/rope lay	5	
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.25 x NRD	
Discard Criteria	Refer to ISO 4309:1990	



NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1960 N/mm <sup>2</sup>		2160 N/mm <sup>2</sup>	
			kN	tonnes	kN	tonnes
6		14.6	25.0	2.5	27.0	2.8
7		19.9	34.0	3.5	36.7	3.7
8		26.0	45.0	4.6	48.6	5.0
9		32.9	56.5	5.8	61.0	6.2
10		40.6	70.0	7.1	75.6	7.7
11		49.1	84.0	8.6	90.7	9.2
12	1/2	58.5	101	10.3	109	11.1
		65.5	113	11.5	121	12.3
13		68.6	118	12.0	127	12.9
14		79.6	137	14.0	148	15.1
15		91.4	157	16.0	169	17.2
16	5/8	104	180	18.3	194	19.8
17		117	203	20.7	219	22.3
18	3/4	132	226	23.0	244	24.9
		147	253	25.8	273	27.8
20		162	279	28.4	301	30.7
22	7/8	197	339	34.6	366	37.3
		201	346	35.3	374	38.1

**Note:** Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.

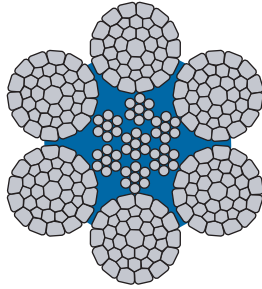
### Typical Applications



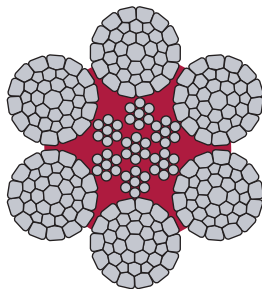
**Note :** For higher lifting heights, consideration should be given to using a 35x7 construction with improved rotational characteristics.



# POWERFORM® 6/6P



Powerform® 6



Powerform® 6P

- Powerform® 6 is a high strength rugged six strand rope ideal for situations where longer service life is required.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.
- Powerform® 6 can be substituted for any six strand construction to improve service life and reduce total cost.
- High fatigue life resulting from the unique compaction process.
- Maximum resistance to crushing. Recommended for multi-layer spooling operations.
- Increased abrasion resistance resulting from the unique compaction process.
- Fully lubricated in manufacturing.
- Optional plastic impregnation (P) signifies full plastic impregnation of the steel core.

## Standard Characteristics Powerform® 6/6P

Construction	6xK36SW(14-7+7-7-1)-CWR 6xK41SW(16+8+8-8-1)-CWR	
Compacted	Yes	No
	◆	
Tensile Grade N/mm <sup>2</sup>	1770	1960
	◆	◆
Finish	Bright	Galvanised
	◆	◆
Lay Direction	Right Hand	Left Hand
	◆	◆
Lay Type	Ordinary	Langs
	◆	
Average Fill Factor (%)	67.5	
Turn value at 20% of breaking force degrees/rope lay	58	
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.5 x NRD	
Discard Criteria	Refer to ISO 4309:1990	

**Warning :** Powerform® 6/6P in Langs lay must only be used in applications where both ends are secured and are unable to rotate.

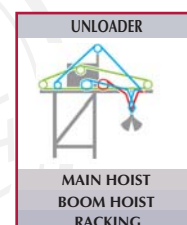
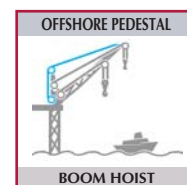
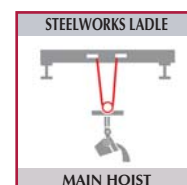
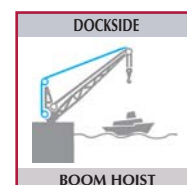
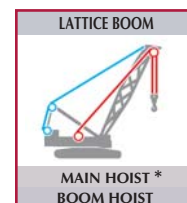
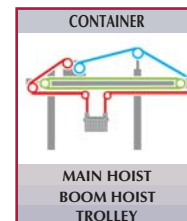


NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1770 N/mm <sup>2</sup>		1960 N/mm <sup>2</sup>	
			kN	tonnes	kN	tonnes
10		46.4	69.5	7.1	85.7	8.7
11		56.1	83.8	8.5	98.6	10.1
12		66.8	100	10.2	114	11.6
	1/2	74.8	113	11.5	140	14.3
13		78.4	118	12.0	147	15.0
14		90.9	137	14.0	170	17.3
15		104	157	16.0	195	19.9
16	5/8	119	178	18.1	218	22.2
17		134	201	20.5	246	25.1
18		150	225	22.9	276	28.1
19	3/4	168	251	25.6	304	31.0
20		186	278	28.3	335	34.1
22		225	336	34.3	400	40.8
	7/8	229	343	35.0	408	41.6
24		267	400	40.8	489	49.8
	1	299	449	45.8	552	56.3
26		314	470	47.9	578	58.9
28		364	545	55.6	657	67.0
30		418	626	63.8	757	77.2
32	1-1/4	475	712	72.6	846	86.2
34		518	804	82.0	916	93.4
36		581	901	91.8	1065	109
38	1-1/2	647	1004	102	1165	119
40		717	1112	113	1295	132
42		790	1226	125	1425	145
44		867	1246	127	1505	153
46		948	1362	139	1665	170
48		1032	1483	151	1885	192
50		1120	1609	164	1975	201
52		1211	1741	177	2135	218
54		1306	1877	191	2325	237
56		1405	2019	206	2475	252
58		1507	2166	221	2650	270
60		1613	2317	236	2810	286

\* Mass per unit length of POWERFORM 6P increases by approx. 3%

- Note:**
- Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.
  - POWERFORM 6P is available only for 16 mm and above on special request and prior confirmation.

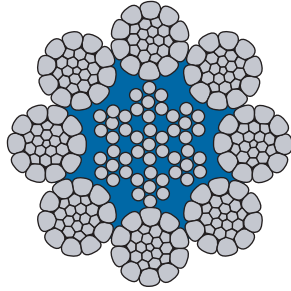
### Typical Applications



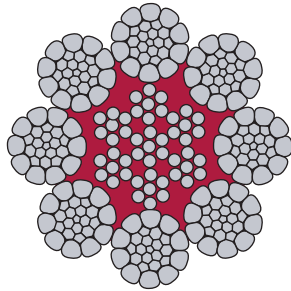
BOOM HOIST ■  
MAIN HOIST ■  
RACKING/TROLLEY ■

\* For higher lifting heights a rotation resistant rope should be selected.

# POWERFORM<sup>®</sup> 8/8P



Powerform<sup>®</sup> 8



Powerform<sup>®</sup> 8P



- Powerform<sup>®</sup> 8P is a high strength eight strand rope with plastic impregnated core ideal for situations where longer service life is required.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.
- High fatigue life resulting from the unique compaction process.
- Maximum resistance to crushing. Recommended for multi-layer spooling operations.
- Increased abrasion resistance resulting from the unique compaction process.
- Greater surface contact area resulting from the eight strand construction and compacted finish give longer rope life and reduced sheave wear.
- Fully lubricated in manufacturing.
- Optional plastic impregnation of the steel core. (P) signifies full plastic impregnation of the steel core.

## Standard Characteristics Powerform<sup>®</sup> 8/8P

Construction	8xK26SW(10-5+5-5-1)-CWR 8xK36SW(14-7+7+7-1)-CWR	
Compacted	Yes	No
	◆	
Tensile Grade N/mm <sup>2</sup>	1960	2160
	◆	
Finish	Bright	Galvanised
	◆	◆
Lay Direction	Right Hand	Left Hand
	◆	◆
Lay Type	Ordinary	Langs
	◆	
Average Fill Factor (%)	65.5	
Turn value at 20% of breaking force degrees/rope lay	94	
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.5 x NRD	
Discard Criteria	Refer to ISO 4309:1990	

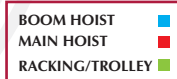
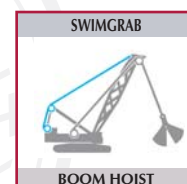
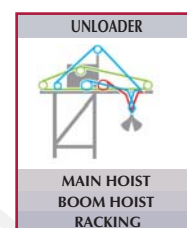
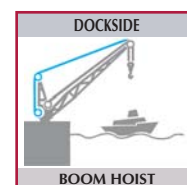
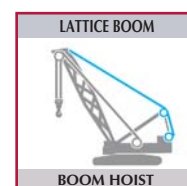
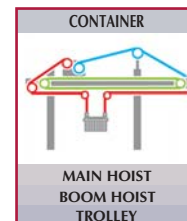
**Warning :** Powerform<sup>®</sup> 8/8P in Langs lay must only be used in applications where both ends are secured and are unable to rotate.

NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1960 N/mm <sup>2</sup>		2160 N/mm <sup>2</sup>	
			kN	tonnes	kN	tonnes
10		46.0	87.8	9.0	94.0	9.6
11		55.7	106	10.8	114	11.6
12		66.2	126	12.8	135	13.8
	1/2	74.2	142	14.5	152	15.5
13		77.7	148	15.1	159	16.2
14		90.2	172	17.5	184	18.8
15		104	198	20.2	211	21.5
16	5/8	118	225	22.9	241	24.6
17		133	254	25.9	272	27.7
18		149	284	29.0	304	31.0
19	3/4	166	317	32.3	339	34.6
20		184	351	35.8	376	38.3
22		223	425	43.3	455	46.4
	7/8	227	434	44.2	464	47.3
24		265	506	51.6	541	55.1
	1	297	567	57.8	606	61.8
26		318	594	60.6	635	64.7
28		368	688	70.1	737	75.1
	1-1/8	384	717	73.1	767	78.2
30		423	790	80.5	846	86.2
32	1-1/4	481	899	91.6	960	97.9
34		543	1013	103	1083	110
36		609	1138	116	1218	124
38	1-1/2	679	1268	129	1357	138
40		752	1405	143	1503	153
42		847	1535	156	1651	168
44		929	1700	173	1819	185
	1-3/4	948	1735	177	1856	189
46		1016	1858	189	1985	202
48		1106	2023	206	2162	220
50		1200	2200	224	2349	239
	2	1239	2266	231	2425	247
52		1298	2374	242	2541	259

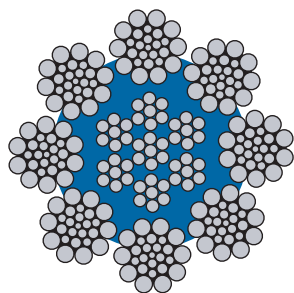
\* Mass per unit length of POWERFORM 8P increases by 3%

- Note:**
- Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.
  - POWERFORM 8P is available for rope diameter 16 mm and above on special request and prior confirmation.

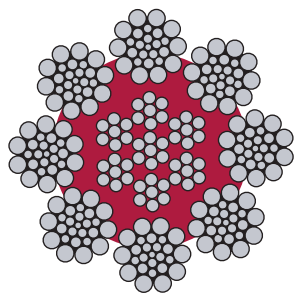
## Typical Applications



# HYFLEX 8/8P



Hyflex 8



Hyflex 8P

- Hyflex 8P is a flexible high strength eight strand steel wire rope with plastic impregnated core.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.
- Good bending fatigue life.
- Greater surface contact area resulting from the eight strand construction.
- Fully lubricated in manufacturing.
- Optional plastic impregnation of the steel core. (P) signifies full plastic impregnation of the steel core.



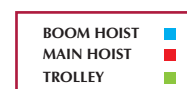
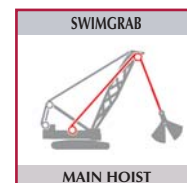
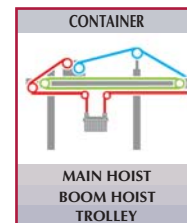
## Standard Characteristics Hyflex 8/8P

Construction	8x26SW(10-5+5-5-1)-CWR 8x36SW(14-7+7-7-1)-CWR	
Compacted	Yes	No
		◆
Tensile Grade N/mm <sup>2</sup>	1960	2160
	◆	
Finish	Bright	Galvanised
	◆	◆
Lay Direction	Right Hand	Left Hand
	◆	◆
Lay Type	Ordinary	Langs
	◆	
Average Fill Factor (%)	59.8	
Turn value at 20% of breaking force degrees/rope lay	87	
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.5 x NRD	
Discard Criteria	Refer to ISO 4309:1990	

**Warning:** Hyflex 8/8P in Langs lay must only be used in applications where both ends are secured and are unable to rotate.

NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE			
			GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1960 N/mm <sup>2</sup>		2160 N/mm <sup>2</sup>	
		kN	tonnes	kN	tonnes	
10		43.5	72.9	7.4	81.4	8.3
11		52.6	86.1	8.8	96.5	9.8
12		62.6	105	10.7	117	11.9
	1/2	70.2	123	12.5	131	13.4
13		73.5	124	12.6	138	14.1
14		85.3	143	14.6	160	16.3
15		97.9	164	16.7	183	18.7
16	5/8	111	187	19.1	208	21.2
17		126	211	21.5	239	24.4
18		141	239	24.4	267	27.2
19	3/4	157	269	27.4	300	30.6
20		174	295	30.1	331	33.7
22		211	356	36.3	400	40.8
	7/8	215	360	36.7	402	41.0
24		251	423	43.1	475	48.4
	1	281	470	47.9	525	53.5
26		297	500	51.0	562	57.3
28		345	572	58.3	642	65.4
	1-1/8	359	596	60.8	665	67.8
30		396	656	66.9	733	74.7
32	1-1/4	451	747	76.1	836	85.2
34		509	843	85.9	945	96.3
36		570	935	95.3	1053	107
38	1-1/2	635	1043	106	1172	119
40		704	1162	118	1313	134
42		785	1305	133	1462	149
44		862	1412	144	1577	161
	1-3/4	879	1441	147	1613	164
46		942	1543	157	1731	176
48		1025	1680	171	1885	192
50		1113	1833	187	2065	210
	2	1148	1882	192	2101	214
52		1203	1972	201	2202	224

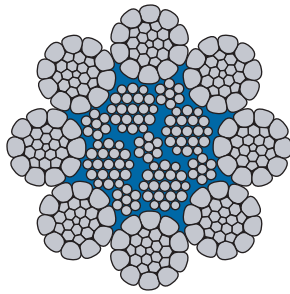
### Typical Applications



\* Mass per unit length of HYFLEX 8P increases by approx. 3%

- Note:**
- Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.
  - HYFLEX 8P is available for rope diameter 16 mm and above on special request and prior confirmation.

# POWERFORM® 8PC



Powerform® 8PC

- Powerform® 8PC is a high strength parallel closed steel wire rope.
- High fatigue life resulting from the unique compaction process and the parallel closed construction.
- Maximum resistance to crushing. Recommended for multi-layer spooling operations.
- Increased abrasion resistance resulting from the unique compaction process.
- Greater surface contact area resulting from the eight strand construction and compacted finish give longer rope life and reduced sheave wear.
- Fully lubricated in manufacturing.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.

## Standard Characteristics Powerform® 8PC

Construction	5mm-9mm	8xK7-CWRP(F4x7-4x7-1x7)
	10mm-50mm	8xK26SW-CWRP (F4x7-4x19W-1x7)
Compacted	Yes	No
	◆	
Tensile Grade N/mm <sup>2</sup>	1960	2160
		◆
Finish	Bright	Galvanised
	◆	◆
Lay Direction	Right Hand	Left Hand
	◆	◆
Lay Type	Ordinary	Langs
	◆	
Average Fill Factor (%)	70.5	
Turn value at 20% of breaking force degrees/rope lay	64	
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.5 x NRD	
Discard Criteria	Refer to ISO 4309:1990	

**Warning :** Powerform® 8PC must only be used in applications where both ends of the rope are secured and unable to rotate.

Powerform® 8PC should not be used in any reeving system where the fleet angle exceeds 1.5 degrees.

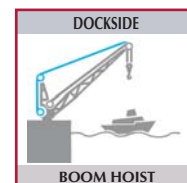
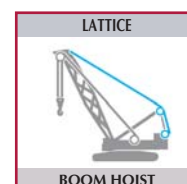
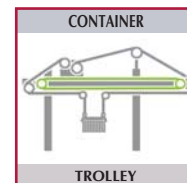




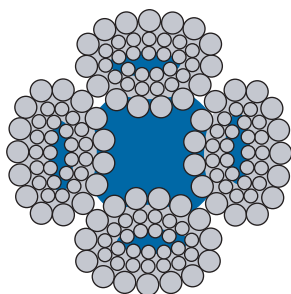
NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1960 N/mm <sup>2</sup>		2160 N/mm <sup>2</sup>	
			kN	tonnes	kN	tonnes
8		31.7	60.5	6.2	66.5	6.8
9		40.1	76.6	7.8	84.2	8.6
10		49.5	94.7	9.7	103	10.5
11		59.9	112	11.4	121	12.3
12	1/2	71.3	138	14.1	150	15.3
		79.8	152	15.5	164	16.7
13		83.7	159	16.2	172	17.5
14		97.0	181	18.5	197	20.1
15		111	213	21.7	232	23.6
16	5/8	127	239	24.4	260	26.5
17		143	269	27.4	292	29.8
18		160	300	30.6	326	33.2
19	3/4	179	341	34.8	371	37.8
20		198	375	38.2	408	41.6
22		240	448	45.7	487	49.6
	7/8	245	457	46.6	497	50.7
24		285	527	53.7	574	58.5
	1	319	592	60.3	646	65.9
26		335	620	63.2	677	69.0
28		388	735	74.9	801	81.7

**Note:** Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.

### Typical Applications



# HYFLEX 4



Hyflex 4

- Rugged 4 strand steel wire rope.
- Good rotation resistance.
- Recommended for severe applications.
- Fully lubricated in manufacturing.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.



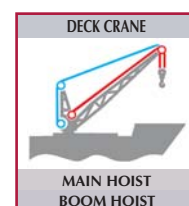
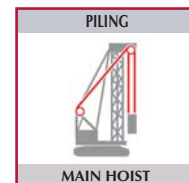
## Standard Characteristics Hyflex 4

Construction	4x39(15-15/9-CFS)-CFS	
Compacted	Yes	No
		◆
Tensile Grade N/mm <sup>2</sup>	1770	1960
		◆
Finish	Bright	Galvanised
	◆	
Lay Direction	Right Hand	Left Hand
	◆	
Lay Type	Ordinary	Langs
	◆	
Average Fill Factor (%)	50.8	
Discard Criteria	Refer to ISO 4309:1990	

**Warning:** Hyflex 4 in Langs lay must only be used in applications where both ends are secured and are unable to rotate.

NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1770 N/mm <sup>2</sup>		1960 N/mm <sup>2</sup>	
			kN	tonnes	kN	tonnes
10		44.8	64.0	6.5	69.4	7.1
12		65.4	92.3	9.4	99.9	10.2
14		88.8	125.5	12.8	136.5	13.9
16	5/8	117	164.5	16.8	177.4	18.1
18		149	207.5	21.2	224.5	22.9
19	3/4	167	231.5	23.6	250.5	25.5
20		183	256.5	26.2	277.5	28.3
22		214	310	31.6	336	34.3
	7/8	218	317	32.3	343	35.0
24		253	369	37.6	400	40.8
25		275	399	40.7	432	44.1
	1	284	413	42.1	448	45.7
26		298	433	44.2	469	47.8
28		346	502	51.2	544	55.5
30		398	576	58.7	624	63.6
32	1.1/4	456	656	66.9	689	70.3
34		512	740	75.5	802	81.8
36		574	830	84.6	898	91.6
38	1.1/2	640	924	94.2	1002	102
40		709	1002	102	1082	110
42		782	1102	112	1192	122
44		859	1212	124	1312	134
45		898	1272	130	1372	140

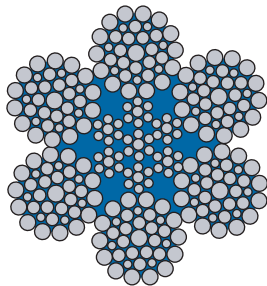
### Typical Applications



**Note:** Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.



# HYFLEX 6X36



Hyflex 6x36

- High quality flexible 6x36 class crane rope.
- Consistent performance.
- Fully lubricated in manufacturing.
- Independent wire rope core.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.
- Supplied in high strength 1960n/mm<sup>2</sup> tensile steel as standard.

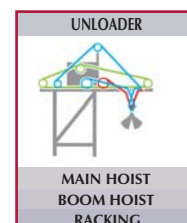
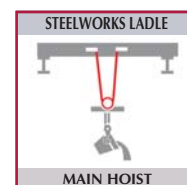
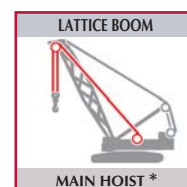
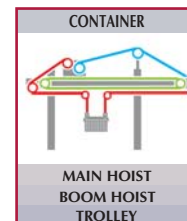


Standard Characteristics Hyflex 6X36		
Construction	6X36(14-7+7-7-1)-CWR 6x41(16-8+8-8-1)-CWR	
Compacted	Yes	No
		◆
Tensile Grade N/mm <sup>2</sup>	1770	1960
		◆
Finish	Bright	Galvanised
	◆	◆
Lay Direction	Right Hand	Left Hand
	◆	◆
Lay Type	Ordinary	Langs
	◆	
Average Fill Factor (%)	60.9	
Turn value at 20% of breaking force degrees/rope lay	56	
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.5 x NRD	
Discard Criteria	Refer to ISO 4309:1990	
<b>Warning :</b> Hyflex 6x36 in Langs lay must only be used in applications where both ends are unable to rotate.		

NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1770 N/mm <sup>2</sup>		1960 N/mm <sup>2</sup>	
			kN	tonnes	kN	tonnes
8		26.1	40.3	4.1	44.7	4.6
9		33.2	51.0	5.2	56.5	5.8
10		40.8	63.0	6.4	69.8	7.1
11		49.4	76.2	7.8	84.4	8.6
12		58.8	90.7	9.2	101	10.3
	1/2	66.0	102	10.4	113	11.5
13		69.2	107	10.9	118	12.0
14		80.2	124	12.6	137	14.0
16	5/8	104	161	16.4	179	18.3
18		132	204	20.8	226	23.0
20		163	252	25.7	279	28.4
22		197	305	31.1	338	34.5
	7/8	201	311	31.7	345	35.2
24	15/16	235	363	37.0	402	41.0
	1	263	407	41.5	450	45.9
26		276	426	43.4	472	48.1
28		320	494	50.4	547	55.8
32	1.1/4	418	645	65.8	715	72.9
36		531	817	83.3	904	92.2
40		655	1010	103	1120	114
44		793	1220	124	1350	138
48	1.7/8	943	1450	148	1610	164
52		1111	1700	173	1890	193
56		1281	1980	202	2190	223
60	2.3/8	1471	2270	231	2510	256

**Note:** Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.

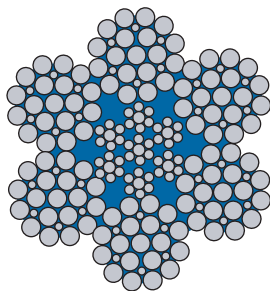
### Typical Applications



\* For higher lifting heights a rotation resistant rope should be selected.



# HYFLEX 6X19



Hyflex 6x19

- High quality flexible 6x19 class crane rope.
- Good resistance to abrasion.
- Consistent performance.
- Fully lubricated in manufacturing.
- Independent wire rope core.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.



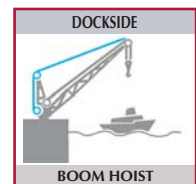
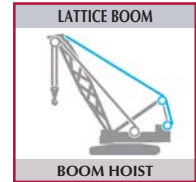
## Standard Characteristics Hyflex 6X19

Construction	6x19S(9-9-1)-CWR 6x19W(6+6-6-1)-CWR 6x25F(12-6F-6-1)-CWR 6x26SW(10-5+5-5-1)-CWR	
Compacted	Yes	No
		◆
Tensile Grade N/mm <sup>2</sup>	1770	1960
		◆
Finish	Bright	Galvanised
	◆	◆
Lay Direction	Right Hand	Left Hand
	◆	◆
Lay Type	Ordinary	Langs
	◆	
Average Fill Factor (%)	59.6	
Turn value at 20% of breaking force degrees/rope lay	42	
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.5 x NRD	
Discard Criteria	Refer to ISO 4309:1990	

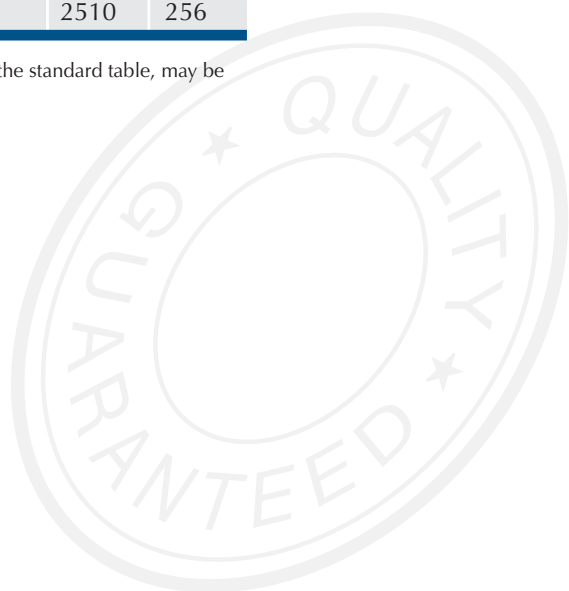
**Warning :** Hyflex 6x19 in Langs lay must only be used in applications where both ends are unable to rotate.

NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE			
			GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1770 N/mm <sup>2</sup>		1960 N/mm <sup>2</sup>	
		kN	tonnes	kN	tonnes	
6		14.3	22.7	2.3	25.1	2.6
7		19.5	30.9	3.1	34.2	3.5
8		25.5	40.3	4.1	44.7	4.6
9		32.2	51.0	5.2	56.5	5.8
10		39.8	63.0	6.4	69.8	7.1
11		48.2	76.2	7.8	84.4	8.6
12		57.3	90.7	9.3	101	10.3
	1/2	64.2	102	10.4	113	11.5
13		67.3	107	10.9	118	12.0
14		78.0	124	12.6	137	14.0
16	5/8	102	161	16.4	179	18.3
18		129	204	20.8	226	23.0
20		159	252	25.7	279	28.4
22		193	305	31.1	338	34.5
	7/8	197	311	31.7	345	35.2
24	15/16	229	363	37.0	402	41.0
	1	257	407	41.5	450	45.9
26		269	426	43.4	472	48.1
28		312	494	50.4	547	55.8
32	1.1/4	408	645	65.8	715	72.9
36		516	817	83.3	904	92.2
40		637	1010	103	1120	114
44		771	1220	124	1350	138
48	1.7/8	917	1450	148	1610	164
52		1076	1700	173	1890	193
56		1248	1980	202	2190	223
60		1433	2270	231	2510	256

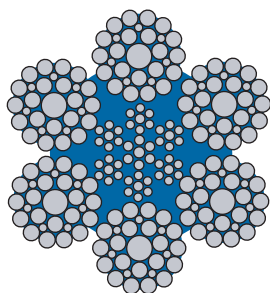
**Typical Applications**



**Note:** Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.



# HYFLEX 6/29Fi



Hyflex 6X29Fi

- High quality flexible crane rope.
- Consistent performance.
- Fully Lubricated in manufacturing.
- Independent wire rope core.
- A sample of rope from each production batch is tested to destruction in order to confirm compliance with catalogue breaking force values.

## Standard Characteristics Hyflex 6X29Fi

Construction	6X29F(14-7F-7-1)-CWR	
Compacted	Yes	No
		◆
Tensile Grade N/mm <sup>2</sup>	1620	1770
		◆
Finish	Bright	Galvanised
	◆	
Lay Direction	Right Hand	Left Hand
	◆	◆
Lay Type	Ordinary	Langs
	◆	
Average Fill Factor (%)	61.2	
Turn value at 20% of breaking force degrees/rope lay	52	
Nominal rope lay length (NRD = Nominal Rope Diameter)	6.5 x NRD	
Discard Criteria	Refer to ISO 4309:1990	
Standard	JIS G. 3525	

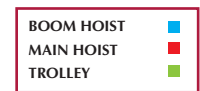
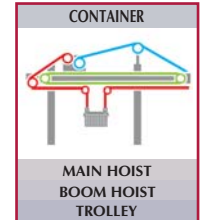
**Warning :** Hyflex 6x29Fi in Langs lay must only be used in applications where both ends are unable to rotate.





NOM. ROPE DIA. mm	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE	
		GALVANISED AND UNGALVANISED	
		1620 N/mm <sup>2</sup>	1770 N/mm <sup>2</sup>
		GRADE A	GRADE B
		kN	kN
10	44	63.6	67.7
11.2	55.2	79.8	84.9
12.5	68.8	99.4	106
14	86.3	125	133
16	113	163	173
18	143	206	219
20	176	254	271
22.4	221	319	340
25	275	398	423
28	345	499	531
30	396	573	609
31.5	437	631	672
33.5	494	714	760
35.5	555	802	853
37.5	619	895	952
40	704	1020	1080
42.5	795	1150	1220
45	891	1290	1370
47.5	993	1440	1530
50	1100	1590	1690
53	1240	1790	1900
56	1380	2000	2120
60	1580	2290	2440

### Typical Applications



**Note:** Rope Sizes and Breaking Force not shown in the standard table, may be available on request and prior confirmation.



## SAFETY INFORMATION

- ▲ Wire rope will fail if worn out, shock loaded, overloaded, misused, damaged, improperly maintained or abused.
- ▲ Always inspect wire rope for wear, damage or abuse before use.
- ▲ Never use a wire rope which is worn out, damaged, corroded or abused.
- ▲ Never overload or shock load a wire rope.
- ▲ Use the correct design factor for the application.
- ▲ Inform yourself : Read and understand the machinery manufacturers handbook and guidance from the wire rope manufacturer.
- ▲ Refer to applicable directives, regulations, standards and codes concerning inspection, examination and rope removal criteria.

All statements, technical information and recommendations contained herein are believed to be reliable, but no guarantee is given as to their accuracy and/or completeness. The user must determine the suitability of the product for his own particular purpose, either alone or in combination with other products and shall assume all risk and liability in connection therewith.

Whilst every attempt has been made to ensure accuracy in the content of the tables, the information contained in this catalogue does not form any part of a contract.

## METRIC – IMPERIAL DIAMETER CONVERSION

in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.
5/32	3.97	1/2	12.7	15/16	23.8	1 1/2	38.1	2 1/2	63.5	4 1/4	108.0
3/16	4.76	9/16	14.3	1	25.4	1 5/16	41.3	2 3/4	69.9	4 1/2	114.3
7/32	5.56	5/8	15.9	1 1/16	27.0	1 3/4	44.5	3	76.2	4 3/4	120.7
1/4	6.35	11/16	17.5	1 1/8	28.6	1 7/8	47.6	3 1/4	82.6	5	127.0
5/16	7.94	3/4	19.0	1 3/16	30.2	2	50.8	3 1/2	88.9		
3/8	9.53	13/16	20.6	1 1/4	31.8	2 1/8	54.0	3 3/4	95.3		
7/16	11.1	7/8	22.2	1 3/8	34.9	2 1/4	57.2	4	101.6		

## CONVERSION TABLE

Length	1m	= 1000 mm	= 3,281ft	= 39,37 inch
Force	1kN	= 101,97kp	= 0,10197 t metric-f	= 224lbs-f
Tensile Strength	1N/mm <sup>2</sup>	= 0,10197 kp/mm <sup>2</sup>	= 145,04 p.s.i.	= 10 bar
Cross Section	1 mm <sup>2</sup>	= 0,00155 sq.inch		
Weight	1 metric t	= 1000 kg = 1,102 short t	= 0,9842 long t	= 2204,6 lbs
Weight per Length Unit	1 kg/m	= 0,672 lbs/ft		

## KEY TO ABBREVIATIONS

K	Compacted
P/PI	Full Plastic Impregnation of the Steel Core
S	Seale Construction
W	Warrington Construction
SW	Seale Warrington Construction
CWS	Wire Strand Core
CWR	Wire Rope Core
CFS	Core man made fibre (Poly)
CWRP	Core Strand closed parallel with outer strands of rope



**USHA MARTIN LIMITED**

2A, Shakespeare Sarani, Kolkata 700 071, India  
Phone : 00 91 33 2282 3985, 39800300, Fax : 00 91 33 39800500/400  
E mail : marketing-rope@ushamartin.com  
www.ushamartin.com

**Overseas offices**

**USHA MARTIN AMERICAS, INC**

7010 Zoltowski Street, Houston  
Texas 77020, USA  
Phone : 00 1 713 676 1800  
Fax : 00 1 713 676 1166  
E mail : marketing-us@ushamartin.com

**USHA MARTIN UK LIMITED**

Unit 5, Blair Court  
Clydebank Business Park  
Clydebank G-81-2LA  
UK  
Phone : 00 44 141 951 8801  
Fax : 00 44 141 951 8802  
E mail : marketing-uk@ushamartin.com

**USHA MARTIN SINGAPORE PTE. LTD.**

53, Shipyard Road  
Singapore 628 140  
Phone : 00 65 62657756  
Fax : 00 65 62657226  
E mail : marketing-singapore@ushamartin.com

**BRUNTON SHAW UK LTD.**

Sandy Lane  
Worksop  
Nottinghamshire  
United Kingdom  
S80 3ES  
Phone : 00 44 1909 537600  
Fax : 00 44 1909 537603  
E mail : marketing-bsuk@ushamartin.com

**USHA MARTIN AUSTRALIA PTY. LTD.**

10, Vicars Place, Wetherill Park  
2164 NSW, Australia  
Phone : 00 612 9609 4971  
Fax : 00 612 9756 6516  
E mail : marketing-australia@ushamartin.com

**UNITED ARAB EMIRATES**

Brunton Wolf Wire Rope FZCo.  
P.O. Box : 17491  
Dubai, Jebel Ali Free Zone  
United Arab Emirates  
Phone : 00 971 48838151  
Fax : 00 971 48838152  
E mail : marketing-bsme@ushamartin.com

**Representative Office**

**VIETNAM**

Usha Martin Singapore Pte. Ltd.  
Unit 609, Hoang Anh Safomec Office Building  
549 - 551 Nguyen Tri Phuong St.  
Ward 14, Dist 10, HCMC  
Phone : 00 84 8 866 9297 / 910 2906  
Fax : 00 84 8 866 9296 / 910 2951  
E mail : ushamartin@hcm.vnn.vn

**Domestic Offices**

**South Regional Office**

USHA MARTIN LIMITED  
N. R. Dave Complex, C-34/201, 2nd Floor  
II Avenue, Anna Nagar, Chennai 600 040  
Phone : 044 2620 4274/76  
Fax : 044 2620 4277  
E mail : marketing-south@ushamartin.com

**West Regional Office**

USHA MARTIN LIMITED  
Agarwal Estate  
168, CST Road, Kalina, Mumbai 400 098  
Phone : 022 2616 0178, 2652 8477  
Fax : 022 2652 6774  
E mail : marketing-west@ushamartin.com

**North Regional Office**

USHA MARTIN LIMITED  
701, "Surya Kiran",  
19, Kasturba Gandhi Marg  
New Delhi 100 001  
Phone : 011 2331 5156/5157/5158  
Fax : 011 2332 0723, 2332 5586  
E mail : marketing-north@ushamartin.com