

# 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 9001:2008 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).

## 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



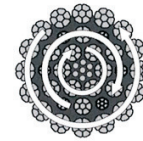
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debsons@gmail.com / debsons@yahoo.com. www.debsons.org or .in or .com  
Jute, Sisal, Manila, Hemp, Cotton, Polypropylene, Danline, Nylon, Aramid.  
IEC NO 0204007356 ★ Mobile 09433090832 ★ GSTIN No. : 19AJXPK70B1ZR

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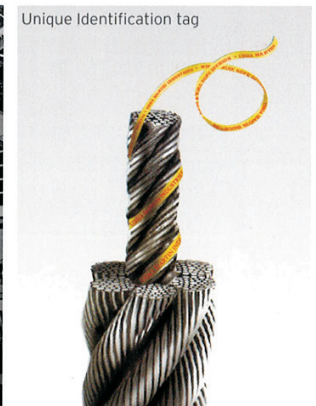
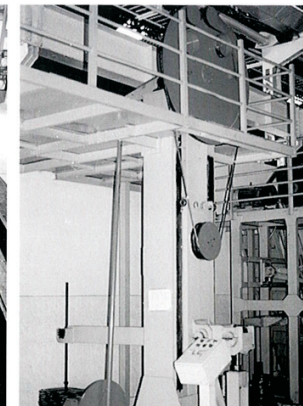
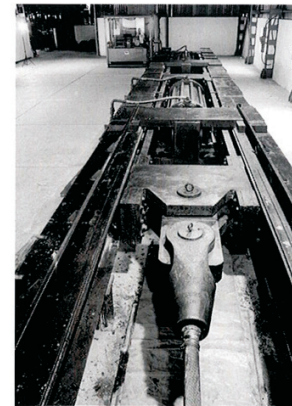
the rope and is therefore of interest to both the ropemaker and the crane operator.

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.

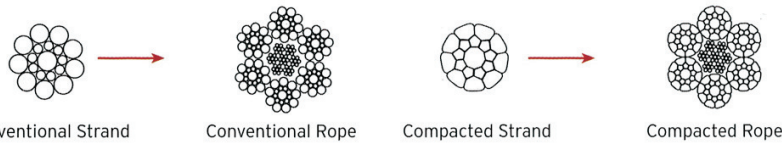
Are you buying the "Real Thing"?



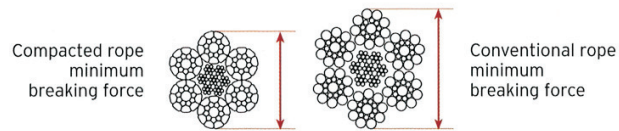
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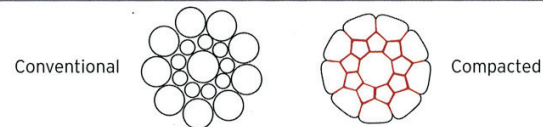
# POWERFORM® COMPACTED ROPE



A Powerform® 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.

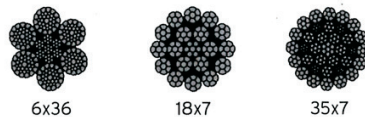


The compacted strand has very favourable internal contact conditions when compared with the point contact of round wires within a normal strand.



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®" and are available in a number of constructions.

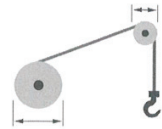


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# POWERFORM® SELECTION

## 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.



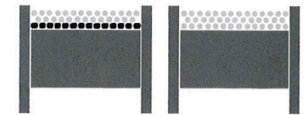
## Long life

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



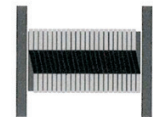
## Greater resistance to crushing in multi-layer coiling situations

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



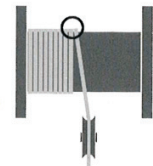
## More effective resistance to crushing at crossover points

Because of the higher steel fill factor Powerform® 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® rope.



## Reduced wear on sheaves

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



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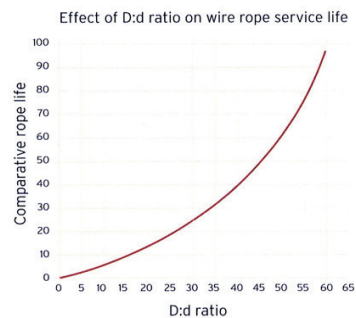
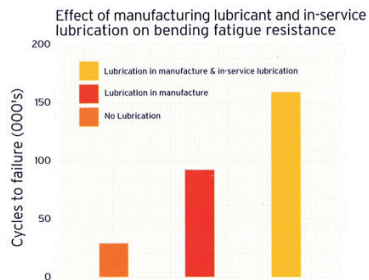
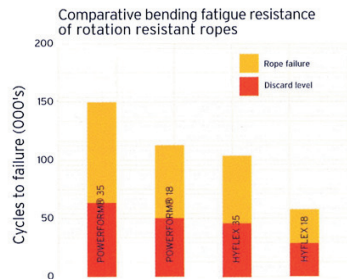
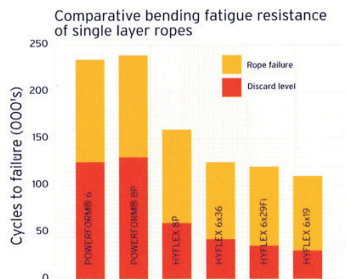


# BEND FATIGUE TESTING

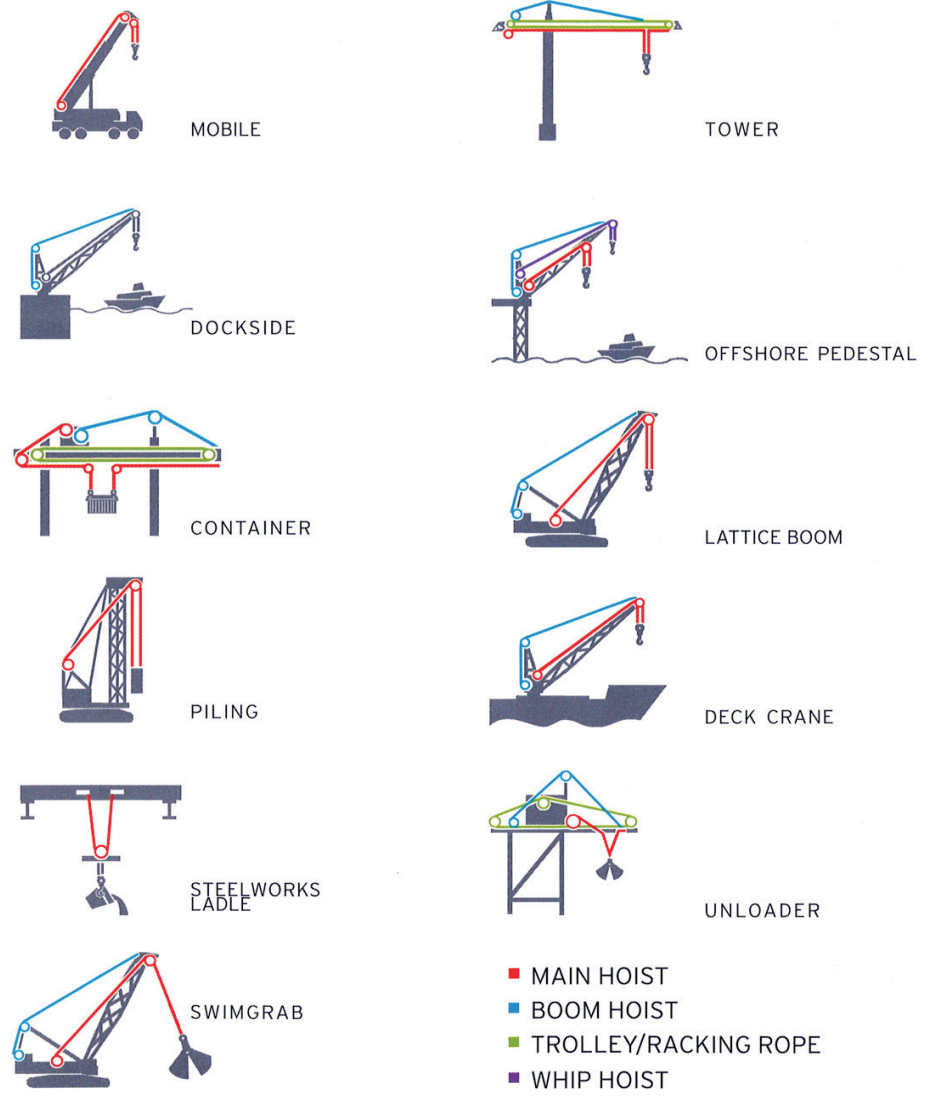
Resistance to bend fatigue is a key factor in determining the service life of wire rope and is therefore of great interest to both the rope manufacturer and the crane operator. Extensive comparative bend fatigue testing is carried out at Usha Martin in order to continuously develop and improve crane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

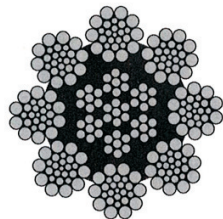
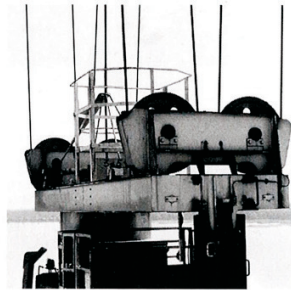


# GUIDE TO APPLICATION & ROPE DUTY

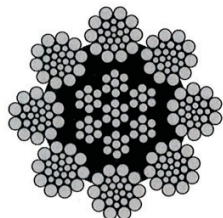


# HYFLEX 8/8P

- 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.



Hyflex 8



Hyflex 8P

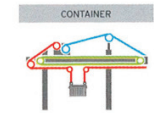
Standard Characteristics Hyflex 8/8P		
Construction	8x26SW(10-5+5-5-1)-CWR 8x36SW(14-7+7-7-1)-CWR	
Compacted	Yes	No
	◆	
Tensile Grade N/mm <sup>2</sup>	1960	2160
	◆	
Finish	Bright	Galvanised
	◆	
Lay Direction	Right Hand	Left Hand
	◆	
Lay Type	Ordinary	Langs
	◆	
Average Fill Factor (%)	59.8	
Turn value 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			
			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	117.0	11.9
	1/2	70.2	123	12.5	131.0	13.4
13		73.5	124	12.6	138.0	14.1
14		85.3	143	14.6	160.0	16.3
15		97.9	164	16.7	183.0	18.7
16	5/8	111.0	187	19.1	208.0	21.2
17		126.0	211	21.5	239.0	24.4
18		141.0	239	24.4	267.0	27.2
19	3/4	157.0	269	27.4	300.0	30.6
20		174.0	295	30.1	331.0	33.7
22		211.0	356	36.3	400.0	40.8
	7/8	215.0	360	36.7	402.0	41.0
24		251.0	423	43.1	475.0	48.4
	1	281.0	470	47.9	525.0	53.5
26		297.0	500	51.0	562.0	57.3
28		345.0	572	58.3	642.0	65.4
	1-1/8	359.0	596	60.8	665.0	67.8
30		396.0	656	66.9	733.0	74.7
32	1-1/4	451.0	747	76.1	836.0	85.2
34		509.0	843	85.9	945.0	96.3
36		570.0	935	95.3	1053.0	107.0
38	1-1/2	635.0	1043	106.0	1172.0	119.0
40		704.0	1162	118.0	1313.0	134.0
42		785.0	1305	133.0	1462.0	149.0
44		862.0	1412	144.0	1577.0	161.0
	1-3/4	879.0	1441	147.0	1613.0	164.0
46		942.0	1543	157.0	1731.0	176.0
48		1025.0	1680	171.0	1885.0	192.0
50		1113.0	1833	187.0	2065.0	210.0
	2	1148.0	1882	192.0	2101.0	214.0
52		1203.0	1972	201.0	2202.0	224.0

\* 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.

## Typical Applications



CONTAINER  
MAIN HOIST  
BOOM HOIST  
TROLLEY

SWINGRAB



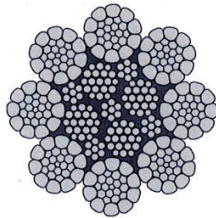
MAIN HOIST

- BOOM HOIST ■
- MAIN HOIST ■
- TROLLEY ■



# 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.



Powerform® 8PC



Standard Characteristics Powerform® 8PC		
Construction	5mm-9mm	8xK7-CWRP(F4x7-4x7-1x7)
	10mm-18mm	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.		



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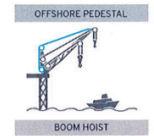
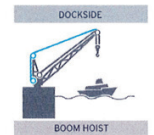
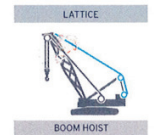
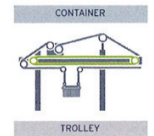
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NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE			
			GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1960 N/mm <sup>2</sup>		2160 N/mm <sup>2</sup>	
		kN	tonnes	kN	tonnes	
8		31.7	60.5	6.2	66.5	6.8
9		40.1	76.6	7.8	84.2	8.6
10		49.5	94.7	9.7	103.0	10.5
11		59.9	112.0	11.4	121.0	12.3
12		71.3	138.0	14.1	150.0	15.3
	1/2	79.8	152.0	15.5	164.0	16.7
13		83.7	159.0	16.2	172.0	17.5
14		97.0	181.0	18.5	197.0	20.1
15		111.0	213.0	21.7	232.0	23.6
16	5/8	127.0	239.0	24.4	260.0	26.5
17		143.0	269.0	27.4	292.0	29.8
18		160.0	300.0	30.6	326.0	33.2

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

Rope dia above 18mm, may be available on request and prior confirmation

## Typical Applications



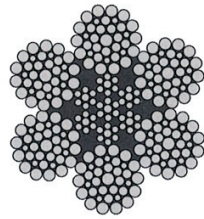
BOOM HOIST ■  
TROLLEY ■

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IEC NO 0204007356 ★ Mobile 09433090832 ★ GSTIN No. : 19AJXPK70B1ZR

# 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.



Hyflex 6x36

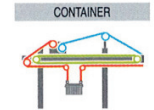
Standard Characteristics Hyflex 6X36		
Construction	6X36(14-7+7-7-1)-CWR 6x41(16-8+8-8-1)-CWR	
Compacted	Yes	No
		◆
Tensile Grade N/mm <sup>2</sup>	1770	1960
		◆
Finish	Bright	Galvanised
	◆	◆
Lay Direction	Right Hand	Left Hand
	◆	◆
Lay Type	Ordinary	Langs
	◆	
Average Fill Factor (%)	60.9	
Turn value 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	
Warning : Hyflex 6x36 in Langs lay must only be used in applications where both ends are unable to rotate.		



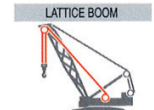
NOM. ROPE DIA. mm	NOM. ROPE DIA. in	APPROX. MASS kg/100m	MINIMUM BREAKING FORCE			
			GALVANISED & UNGALVANISED			
			ROPE GRADE			
			1770 N/mm <sup>2</sup>		1960 N/mm <sup>2</sup>	
		kN	tonnes	kN	tonnes	
8		26.1	40.3	4.1	44.7	4.6
9		33.2	51.0	5.2	56.5	5.8
10		40.8	63.0	6.4	69.8	7.1
11		49.4	76.2	7.8	84.4	8.6
12		58.8	90.7	9.2	101.0	10.3
	1/2	66.0	102.0	10.4	113.0	11.5
13		69.2	107.0	10.9	118.0	12.0
14		80.2	124.0	12.6	137.0	14.0
16	5/8	104.0	161.0	16.4	179.0	18.3
18		132.0	204.0	20.8	226.0	23.0
20		163.0	252.0	25.7	279.0	28.4
22		197.0	305.0	31.1	338.0	34.5
	7/8	201.0	311.0	31.7	345.0	35.2
24	15/16	235.0	363.0	37.0	402.0	41.0
	1	263.0	407.0	41.5	450.0	45.9
26		276.0	426.0	43.4	472.0	48.1
28		320.0	494.0	50.4	547.0	55.8
32	1.1/4	418.0	645.0	65.8	715.0	72.9
36		531.0	817.0	83.3	904.0	92.2
40		655.0	1010.0	103.0	1120.0	114.0
44		793.0	1220.0	124.0	1350.0	138.0
48	1.7/8	943.0	1450.0	148.0	1610.0	164.0
52		1111.0	1700.0	173.0	1890.0	193.0
56		1281.0	1980.0	202.0	2190.0	223.0
60	2.3/8	1471.0	2270.0	231.0	2510.0	256.0

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

## Typical Applications



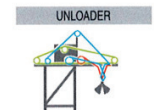
CONTAINER  
MAIN HOIST  
BOOM HOIST  
TROLLEY



LATTICE BOOM  
MAIN HOIST \*



STEELWORKS LADLE  
MAIN HOIST



UNLOADER  
MAIN HOIST  
BOOM HOIST  
RACKING

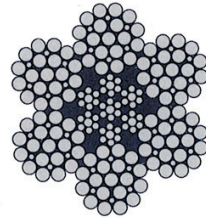
- BOOM HOIST ■
- MAIN HOIST ■
- RACKING/ TROLLEY ■

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



# 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.



Hyflex 6x19

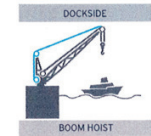
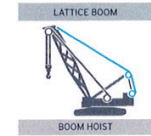
Standard Characteristics Hyflex 6X19		
Construction	6x19S(9-9-1)-CWR 6x19W(6+6-6-1)-CWR 6x25F(12-6F-6-1)-CWR 6x26SW(10-5+5-5-1)-CWR	
Compacted	Yes	No
		◆
Tensile Grade N/mm <sup>2</sup>	1770	1960
		◆
Finish	Bright	Galvanised
	◆	◆
Lay Direction	Right Hand	Left Hand
	◆	◆
Lay Type	Ordinary	Langs
	◆	
Average 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			
			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	101.0	10.3
	1/2	64.2	102.0	10.4	113.0	11.5
13		67.3	107.0	10.9	118.0	12.0
14		78.0	124.0	12.6	137.0	14.0
16	5/8	102.0	161.0	16.4	179.0	18.3
18		129.0	204.0	20.8	226.0	23.0
20		159.0	252.0	25.7	279.0	28.4
22		193.0	305.0	31.1	338.0	34.5
	7/8	197.0	311.0	31.7	345.0	35.2
24	15/16	229.0	363.0	37.0	402.0	41.0
	1	257.0	407.0	41.5	450.0	45.9
26		269.0	426.0	43.4	472.0	48.1
28		312.0	494.0	50.4	547.0	55.8
32	1 1/4	408.0	645.0	65.8	715.0	72.9
36		516.0	817.0	83.3	904.0	92.2
40		637.0	1010.0	103.0	1120.0	114.0
44		771.0	1220.0	124.0	1350.0	138.0
48	1 7/8	917.0	1450.0	148.0	1610.0	164.0
52		1076.0	1700.0	173.0	1890.0	193.0
56		1248.0	1980.0	202.0	2190.0	223.0
60		1433.0	2270.0	231.0	2510.0	256.0

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

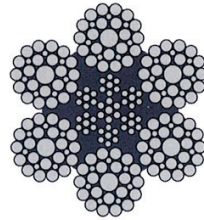
## Typical Applications



BOOM HOIST ■

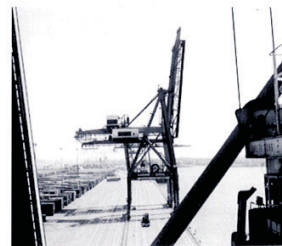
# HYFLEX 6X29Fi

- 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.



Hyflex 6X29Fi

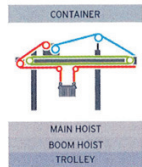
Standard Characteristics Hyflex 6X29Fi		
Construction	6X29F(14-7F-7-1)-CWR	
Compacted	Yes	No
		◆
Tensile Grade N/mm <sup>2</sup>	1620	1770
		◆
Finish	Bright	Galvanised
	◆	◆
Lay Direction	Right Hand	Left Hand
	◆	◆
Lay Type	Ordinary	Langs
	◆	◆
Average Fill Factor (%)	61.2	
Turn value at 20% of breaking 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	106.0
14	86.3	125.0	133.0
16	113.0	163.0	173.0
18	143.0	206.0	219.0
20	176.0	254.0	271.0
22.4	221.0	319.0	340.0
25	275.0	398.0	423.0
28	345.0	499.0	531.0
30	396.0	573.0	609.0
31.5	437.0	631.0	672.0
33.5	494.0	714.0	760.0
35.5	555.0	802.0	853.0
37.5	619.0	895.0	952.0
40	704.0	1020.0	1080.0
42.5	795.0	1150.0	1220.0
45	891.0	1290.0	1370.0
47.5	993.0	1440.0	1530.0
50	1100.0	1590.0	1690.0
53	1240.0	1790.0	1900.0
56	1380.0	2000.0	2120.0
60	1580.0	2290.0	2440.0

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

## Typical Applications



- BOOM HOIST ■
- MAIN HOIST ■
- TROLLEY ■



# 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	5/16	23.8	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	15/16	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