ArcelorMittal Europe
WireSolutions

ArcelorMittal

Ropeway ropes

High performance Ropeway ropes for the most demanding environments

XCarb®
Recycled and renewably produced

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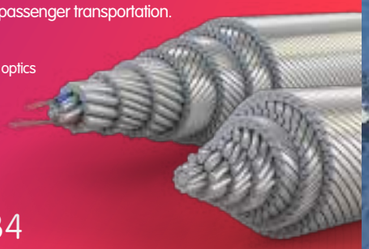

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ArcelorMittal ROPES
ENGINEERING EXCELLENCE

ArcelorMittal ROPES

ENGINEERING EXCELLENCE

ArcelorMittal

Productivity depends on efficiencies

ArcelorMittal ROPES is part of the ArcelorMittal Group – one of the largest steel producers in the world and the manufacturer of premium quality steel wire ropes for the ropeway, mining, hoisting and mooring sectors.

Recognised worldwide for the quality of its corrosion resistant products, ArcelorMittal manufactures and supplies some of the most technologically advanced steel wire ropes in the world.

Designed, developed and manufactured for strength, flexibility and endurance, ArcelorMittal ROPES delivers lasting value and safety for the most demanding environments.

ArcelorMittal Ropes est reconnu comme fournisseur de solutions premium dans le domaine des câbles de remontées mécaniques, de mines, de levage et d'ancrage offshore.

Nos 4 marchés sont:

ROPEWAY ROPES

MINING ROPES

HOISTING ROPES

MOORING ROPES

"Our vertically integrated business model enables us to efficiently track and trace the origins of the materials we use, improving quality controls and reducing costs"

Nicolas Hocquaux
Sales Manager, ROPEWAY ROPES

Vertical integration. Unparalleled value.

Our mining, steel production, wire rod handling, wire drawing and rope manufacture is all undertaken by ArcelorMittal.

Our fully integrated business model gives us complete control over the quality of our raw materials and the highest levels of confidence in our production methods and processes, saving us time and resources.

This, combined with our world-class technical expertise, provides our customers with unparalleled value.

New levels of performance

Operating for all ArcelorMittal Group units, ArcelorMittal ROPES benefits from the Group's worldwide research and development resources.

Research and development are the cornerstone of sustainable development and innovation and this ensures the continuous renewal of our product offer. Worldwide we have 1400 full time researchers and 13 research centres.

Working together with customers to optimise solutions

With increased focus on new product development, innovation and optimisation, our production and quality control teams work with our customers to deliver high performance solutions that meet their requirements. ArcelorMittal ROPES is your strategic partner. We offer much more than high quality, competitively priced steel wire ropes. Our purpose is to work with our customers to fulfil their technical requirements, quickly, safely and efficiently. Your success is our success.

"At ArcelorMittal ROPES, our entire design and production process is part of our continuous quality control system. Because of our rigorous monitoring processes we can say, with confidence, that we are creating innovative products that anticipate and respond to the changing global market."

Benjamin Coutaz
Head of Development and Design
ArcelorMittal ROPES

Unrivalled technical experience

Established in 1906, our manufacturing capability is backed up by over 100 years experience, providing our customers with a complete manufacturing solution that creates optimum value.

We exist to manufacture steel wire ropes that exceed the expectations of our worldwide customer base.

Engineering Excellence is what ArcelorMittal ROPES stands for. Our commitment to quality and the highest product performance standards is based on our process of continuous improvement.

ArcelorMittal ROPES runs an internal DNV-Certified Quality Assurance System complying with the requirements of ISO 9001.

Our continuous improvement process means that we are certified ISO 45001 for safety management. Thanks to this commitment, our production plant can implement an optimised process control environment, creating world-class steel wire rope products.

Full traceability every step of the way

Improving quality and adding value.

Our vertically integrated business model enables us to efficiently track and trace the origins of the materials we use, improving quality controls and reducing costs.

From the sourcing of raw materials to the manufacture of our wire rod, and from the drawing of our steel wire to the manufacture of our ropes, we guarantee full traceability every step of the way.

Helping our customers to exceed

Located in Bourg-en-Bresse, France, our specialist teams, comprising of more than 300 people, continue to build on our international reputation for engineering the highest quality wire ropes.

More than just a steel wire ropes company, our purpose is to help our customers deliver their projects quickly, safely and efficiently. We achieve this by working with our customers to identify, develop and deliver optimum solutions.

Why choose ArcelorMittal ROPES?

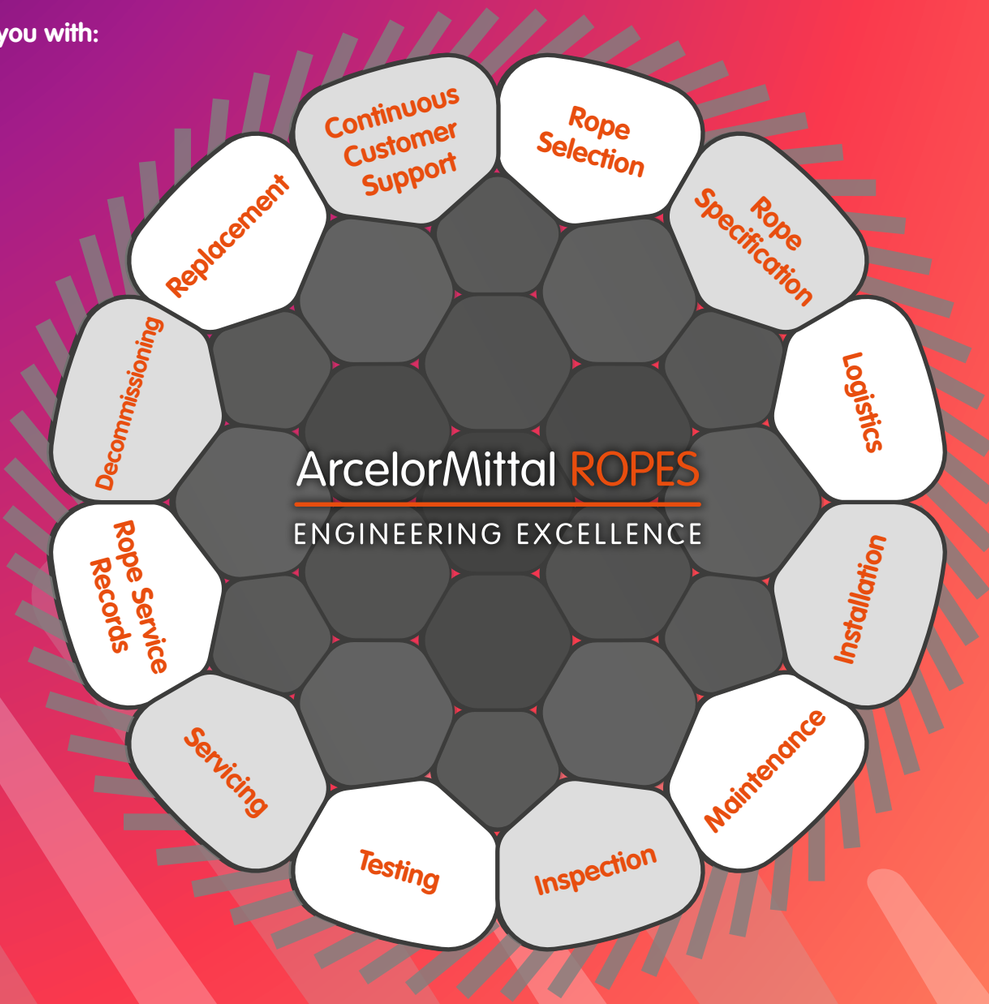
- Engineering Excellence
- Innovation
- Continuous investment in product innovation and development
- Comprehensive solutions
- Established for more than 110 years
- Delivering all around the world
- Vertically integrated business model
- Full materials traceability
- Your expert strategic partner
- Ongoing customer support

ArcelorMittal

Technical expertise and support for the long term

ArcelorMittal ROPES provides a comprehensive support network for new and existing customers.

We can help you with:



ArcelorMittal ROPES
ENGINEERING EXCELLENCE

Improving the effects of our activities on the environment

We recognise the importance for sustainable development and we continually aim to improve the environmental effect of our activities.

To help achieve our aims we:

- Meet, and wherever possible, improve upon relevant legislative, regulatory and environmental codes of practice.
- Develop objectives that target environmental improvements.
- Consider environmental issues in our decision-making processes.
- Develop our relationships with suppliers and contractors so that we all understand and recognise our environmental responsibilities.
- Educate employees so that they can carry out their activities in an environmentally responsible manner.
- Promote our environmental performance and achievements amongst customers, employees, suppliers, contractors and the public.

We make sure that we use resources efficiently by:

- Advising staff on how best to use energy and other utilities.
- Promoting waste minimisation, recycling and the creation of by-products.
- Promoting the efficient use of resources, energy and fuel throughout our manufacturing, processing, sales and distribution operations.

We are active participants who co-operate with:

- The communities in which we operate.
- The government, regulatory bodies and other interested parties who share our vision of being a responsible and trusted neighbour.

Our commitment to health, safety and wellbeing

*"Everyone has the right to good health and safety. Equally, everyone has the responsibility to make this happen at home and at work. Leaders, machinery operators, office workers, contractors – we all need to believe that **Journey to Zero** is achievable and to feel responsible for health and safety".*

Lakshmi Mittal
Chairman and CEO, ArcelorMittal

The health, safety and wellbeing of all our employees and contractors is at the core of our commitment to produce high performance ropes.

Journey to Zero is the name of ArcelorMittal's ongoing campaign to work vigorously towards a sustainable goal of zero accidents and injuries.

We work every day in dangerous conditions, where accidents are always possible. With our **Journey to Zero** campaign to reduce workplace accidents, injuries and occupational health problems to zero, we have set ourselves the challenge of becoming the safest steel wire ropes manufacturer in the world.

Wire Rope Properties

Every demanding situation requires a rope with particular performance characteristics. These requirements are determined by the physical environment and the level and type of usage.

Lubrication
Extends the life and increases rope performance.

Compaction
Smoother outer surface with increased strength and reduced wear.

Resistance to Crushing
Ropes designed to withstand or resist external forces.

High Breaking Resistance
Ropes featuring a high breaking force.

Stretch Resistant
Due to our optimum design and manufacturing process, rope elongation after stabilisation is between 0.1% and 0.3%.

Bending Fatigue Resistance
Ropes designed to cope with bending repeatedly under stress.

Bright Wire
Drawn steel, pickled and phosphated and suitable for non corrosive environments.

Galvanised Wire Coating
Zinc coating suitable for corrosive environments.

Corzal® Wire Coating
Corzal® is an eutectic alloy of 95% zinc and 5% aluminium that resists corrosion up to 3 times longer than a pure zinc coating.

ArcelorMittal ROPES
ENGINEERING EXCELLENCE

Rope Application Guide

Which rope, which application?

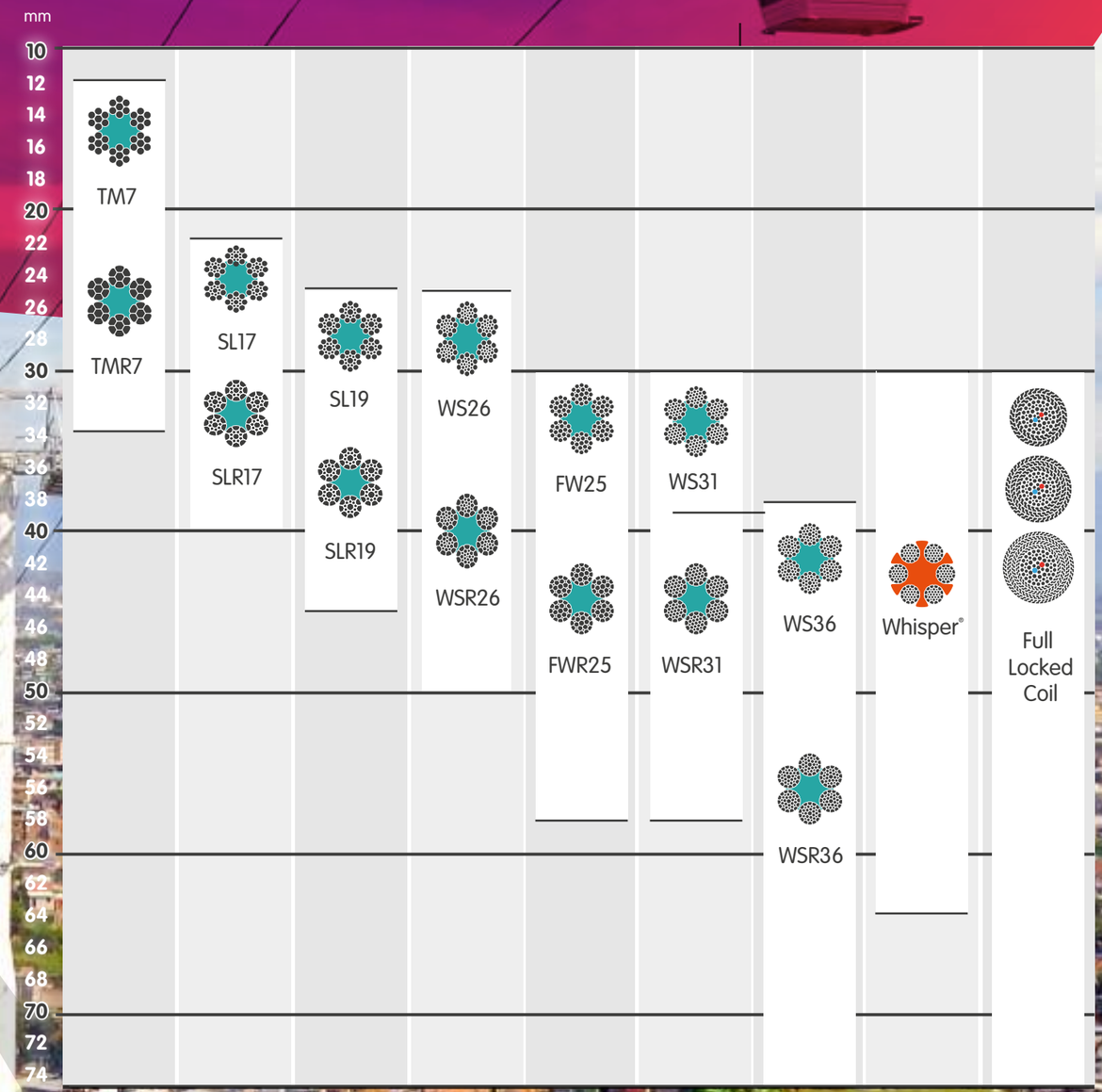
Different ropeway applications require a rope that will meet the exceptionally demanding requirements for safety, reliability, passenger comfort, longevity and, of course, value for money.

The ArcelorMittal Ropeway Ropes team are experts in their field, producing many thousands of kilometres of premium quality steel rope each year and providing technical advice to their worldwide customer base.

Use our 'at a glance' guide to select the correct ropes for your applications and ensure that you maximise safety and operational performance.

	6 Strand Ropes	6 Strand Compacted Ropes	Whisper®	Full Locked Coil Ropes	Full Locked Coil Ropes with Optic Fibre
Teleski	●	●			
Chairlift	●	◉	◉		
Detachable Chairlift	●	●	●		
Gondola	●	●	●		
Funitel	◉	●	●		
Gondola 2S/3S	●	●	●	●	●
Cable Car	●	●	●	●	●
Material Cable Car	●	●		●	●
Funicular	●	●	●		

KEY: ● HAULING ROPE ● TRACK ROPE ◉ HAULING OPTION



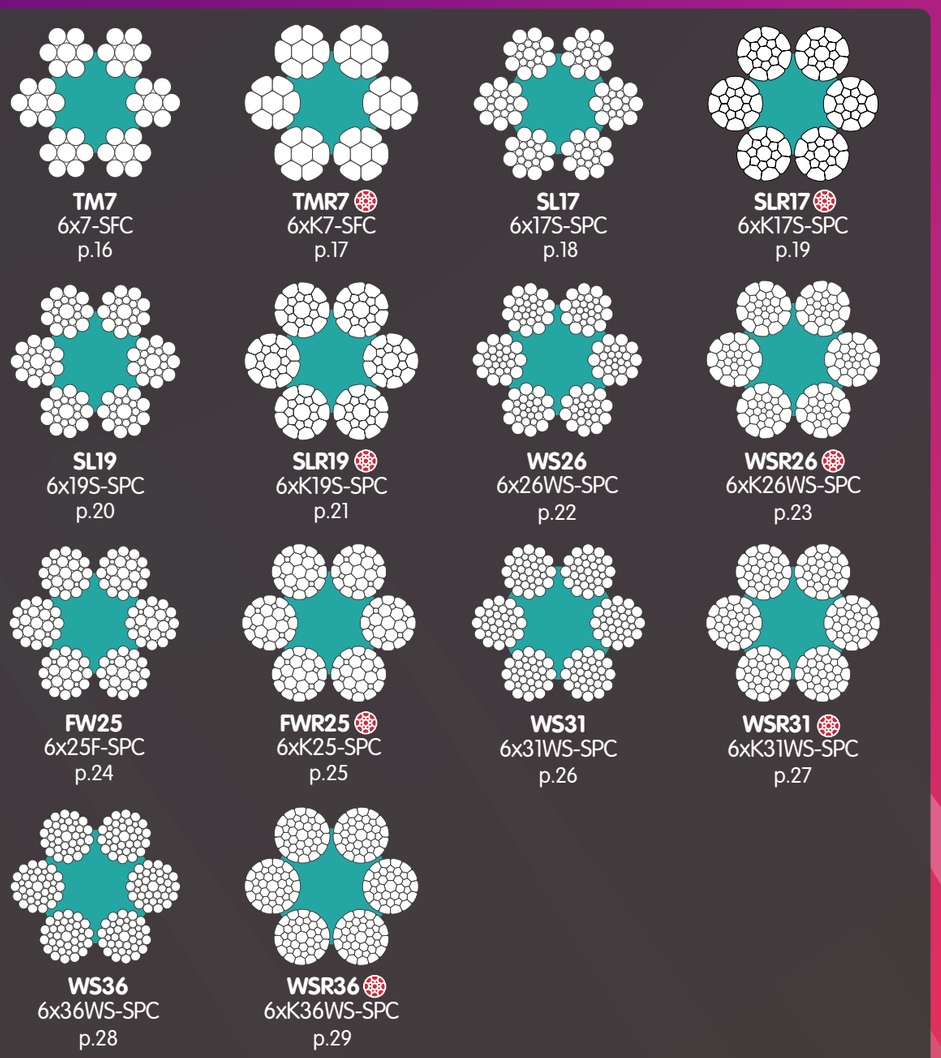
ArcelorMittal ROPES
ENGINEERING EXCELLENCE

Altitude®

Altitude® ropes from ArcelorMittal ROPES offer superior strength, stretch resistance and resistance to bending fatigue.

Compacted strands around a central solid plastic core deliver outstanding levels of resistance against crushing and abrasion.

Compacted Rope



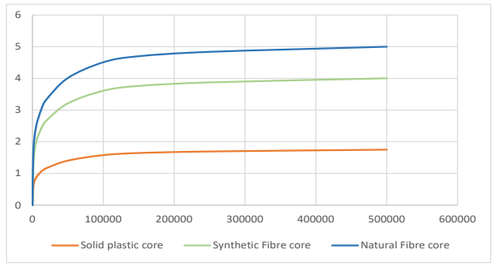
Solid core technology

Exclusive technology

Acknowledged as an innovation in its field, ArcelorMittal's Solid Core Technology is both a technical and a commercial triumph. Thousands of ropes in use in all parts of the world testify to the technology's unrivalled performance:

- Extreme accuracy of geometric characteristics
- Meticulous elaboration of high-resistance wires
- Know-how of our rope experts

The best guarantee of stability and smooth operation is ensured by the perfect assembly of the rope's components on our compact core.



Natural Fibre Core

Synthetic Fibre Core

Solid Plastic Core

The level of stretch of our compact core ropes is extremely low at approx 1.8‰ when the rope reaches its end of life.

The very low diameter reduction of compact ropes keeps the consistent quality of the interface between the rope and the installation on which it is used.

Extreme safety

In contrast to ropes assembled on multiwire cores, the use of the compact monowire core provides optimum stability concerning the contact of the rope with such organs as vehicle attachments, rollers and transmission sheaves and pulleys.

Maximum comfort

The compact monowire core, plus a unique roping manufacturing technique (the only one of its kind in the world) guarantees perfect control and regularity of the rope and straightness.

Exceptional stability

The assembly technique and the choice of material for the monowire core provide the best possible guarantee that the original rope geometry is kept during the whole rope life; smallest variations in rope diameter and length in service.

Longer life span

The exceptional qualities of the compact core technology provide an extremely long service life; no contact between adjacent strands, even at the end of the service life,this allows to take profit of the maximum fatigue life potential of the individual steel wires.

Reduced maintenance

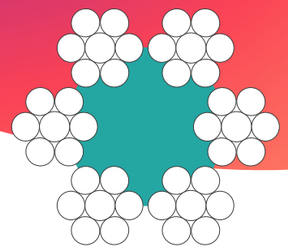
- Shortening operations eliminated or reduced.
- Consistent efficiency of attachments.

ArcelorMittal ROPES
ENGINEERING EXCELLENCE

6x7-SFC

Altitude® TM7

Altitude® TM7 is a 6 strand rope with a high breaking load that is designed for teleskis and chairlifts and engineered for high resistance to stretching and bending.



Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
12	56	1.30	0.506	91	80	102	90	115	100	120	105
13	66	1.40	0.595	107	94	120	105	135	118	141	123
14	77	1.50	0.690	124	109	140	122	156	137	163	143
15	88	1.63	0.793	143	125	160	140	180	157	187	164
16	100	1.73	0.903	163	142	183	160	204	179	213	187
17	113	1.83	1.020	184	161	206	180	231	202	241	211
18	127	1.95	1.144	206	180	231	202	259	227	270	236
19	142	2.05	1.275	229	201	258	226	289	252	301	263
20	157	2.15	1.413	254	223	286	250	320	280	334	292
21	173	2.27	1.558	280	245	315	276	353	309	368	322
22	190	2.37	1.710	308	269	346	303	387	339	404	354
23	208	2.50	1.869	337	294	378	331	423	370	442	386
24	226	2.60	2.036	366	321	412	360	461	403	481	421
25	245	2.70	2.209	398	348	447	391	500	438	522	457
26	266	2.80	2.390	430	376	483	423	541	473	565	494
27	286	2.90	2.577	464	406	521	456	583	510	609	533
28	308	3.00	2.772	499	437	561	491	627	549	655	573
29	330	3.15	2.974	535	468	601	526	673	589	703	615
30	354	3.25	3.183	573	501	644	563	720	630	752	658
31	378	3.35	3.399	612	535	687	601	769	673	803	703
32	402	3.45	3.622	652	570	732	641	820	717	856	749

Values are indicative for guidance only

Indicative values. The tolerance value for each table is 0 / + 4% under 10 to 20% of MBL.

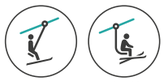
Please note: Other diameters with other tolerances than those illustrated can be manufactured on request.

QUALITY
ArcelorMittal ROPES operates an internal DNV-Certified Quality Assurance System which complies with the requirements of ISO 9001.

Our production plant in Bourg-en-Bresse is certified OHSAS 18001 for safety management.

You can see a full list of our international standards on page 43.

Applications

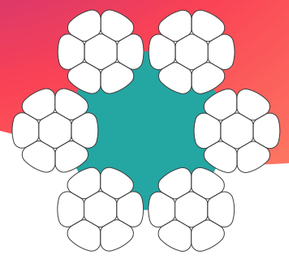


Properties

6xK7-SFC

Altitude® TMR7

Altitude® TMR7 is a 6-strand compacted rope for teleskis, chairlifts, cable cars, tramways. High breaking load, abrasion, stretch, bend resistance.



Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
17	132	1,97	1,164	214	184	240	206	269	231	280	241
18	147	2,10	1,293	239	205	268	231	300	258	313	269
19	164	2,20	1,430	265	228	298	256	333	287	348	299
19,5	172	2,27	1,501	279	240	313	269	351	302	366	315
20	181	2,33	1,574	293	252	329	283	368	317	384	331
21	199	2,45	1,726	322	277	362	311	405	349	423	364
22	218	2,55	1,885	353	304	397	341	444	382	463	398
23	238	2,65	2,052	385	331	433	372	484	417	506	435
24	259	2,80	2,226	419	360	471	405	527	453	550	473
25	280	2,90	2,407	454	390	510	439	571	491	596	512
26	303	3,00	2,596	490	422	551	474	617	530	644	554
27	326	3,10	2,792	528	454	594	511	664	571	693	596
28	350	3,25	2,995	568	488	638	549	714	614	745	641
29	376	3,35	3,206	609	523	684	588	765	658	799	687
30	402	3,45	3,424	651	560	731	629	818	704	854	734
31	429	3,55	3,650	694	597	780	671	873	751	911	784
32	456	3,70	3,883	739	636	831	714	930	800	970	835
33	485	3,80	4,124	786	676	883	759	988	850	1031	887
34	515	3,90	4,372	834	717	937	806	1049	902	1094	941

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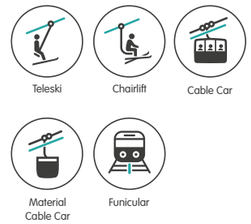
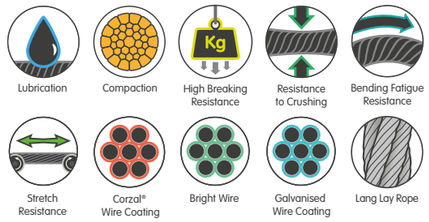
Applications



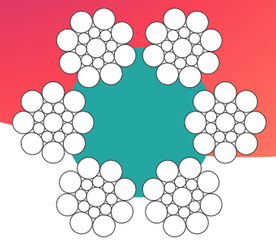
Properties

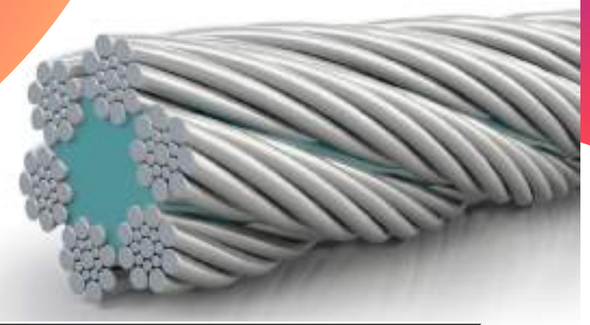


6x17S-SPC

Altitude®SL17

Altitude®SL17 is a 6 strand rope with a high breaking load that is designed for chairlifts, gondolas, passenger and material cable cars and tramways. **Altitude®SL17 is** a lang lay rope engineered for high resistance to stretching and bending.





Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
23	217	2.05	1.931	352	308	395	346	442	387	464	406
24	236	2.13	2.103	383	335	430	376	481	421	505	442
25	256	2.23	2.282	415	363	466	408	522	457	547	479
26	277	2.30	2.469	449	393	504	441	564	494	592	518
27	299	2.40	2.663	484	423	543	476	608	532	638	558
28	321	2.50	2.865	520	455	584	511	654	572	686	600
29	344	2.55	3.073	558	488	627	548	701	614	736	644
30	368	2.65	3.289	597	522	670	587	750	657	787	689
31	393	2.75	3.513	637	557	716	626	801	701	841	735
31.5	406	2.80	3.627	658	576	739	647	827	724	868	759
32	419	2.85	3.743	679	594	762	667	853	747	895	784
33	445	2.95	3.981	722	631	811	709	907	794	952	833
33.5	459	2.95	4.103	744	651	835	731	935	818	981	859
34	473	3.00	4.226	766	670	861	753	963	843	1011	884
35	501	3.10	4.479	812	710	912	798	1020	893	1071	937
36	530	3.20	4.739	858	751	964	844	1079	945	1133	991
36.5	545	3.25	4.872	882	772	991	867	1110	971	1164	1019
37	560	3.30	5.006	907	793	1019	891	1140	998	1196	1047
38	590	3.35	5.281	956	837	1074	940	1202	1052	1262	1104
39	622	3.45	5.563	1007	881	1132	990	1266	1108	1329	1163
40	654	3.55	5.852	1059	927	1190	1041	1332	1166	1398	1223
40.5	670	3.60	5.999	1086	950	1220	1068	1366	1195	1433	1254

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You can see a full list of our international standards on page 43.

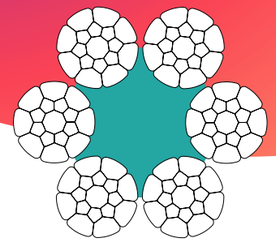
Applications

Properties

6xK17S-SPC

Altitude®SLR17

Altitude®SLR17 is a 6 strand compacted rope with an exceptionally high breaking load that is designed for chairlifts, gondolas, passenger and material cable cars and tramways. **Altitude®SLR17** is a lang lay rope engineered for high resistance to abrasion, stretching, bending and crushing.



Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
21	201	1,97	1,736	326	280	366	315	410	352	430	370
22	221	2,05	1,904	357	307	402	345	449	387	472	406
23	241	2,15	2,081	391	336	439	377	491	422	515	443
24	262	2,25	2,265	425	366	478	411	535	460	561	482
25	285	2,35	2,457	461	397	518	446	580	499	608	523
26	308	2,45	2,657	499	429	560	482	627	539	658	566
27	332	2,55	2,864	538	462	604	519	676	581	709	610
28	357	2,60	3,080	578	497	649	558	727	625	763	656
29	383	2,70	3,303	620	533	696	599	780	670	818	703
30	409	2,80	3,534	663	570	745	641	834	717	875	753
31	437	2,90	3,773	708	609	796	684	890	766	934	803
32	466	3,00	4,020	755	649	848	729	949	816	995	856
33	495	3,10	4,275	802	690	901	775	1009	868	1058	910
34	526	3,20	4,537	852	732	957	823	1071	921	1123	966
35	557	3,30	4,807	902	776	1014	872	1135	976	1190	1024
36	589	3,35	5,085	954	821	1072	922	1200	1032	1259	1083
37	622	3,45	5,371	1008	867	1133	974	1268	1090	1330	1144
38	656	3,55	5,665	1063	914	1195	1027	1337	1150	1403	1206
39	691	3,65	5,967	1120	963	1258	1082	1408	1211	1477	1271
40	727	3,75	6,276	1178	1013	1323	1138	1481	1274	1554	1336

Values are indicative for guidance only

Indicative values. The tolerance value for each table is 0 / + 4% under 10 to 20% of MBL.

Please note: Other diameters with other tolerances than those illustrated can be manufactured on request.

QUALITY
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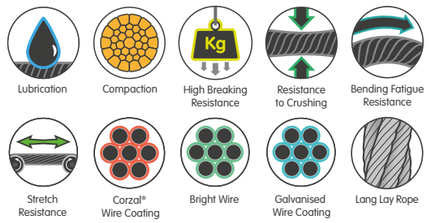
You can see a full list of our international standards on page 43.

Applications

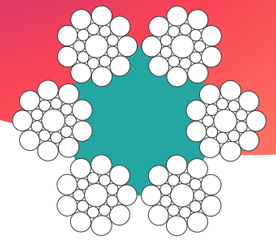
Properties



6x19S-SPC

Altitude® SL19

Altitude® SL19 is a 6 strand rope with a high breaking load that is designed for chairlifts, gondolas, passenger and material cable cars and tramways. **Altitude SL19** is a lang lay rope engineered for high resistance to stretching and bending.



Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
25	260	2.03	2.312	421	368	473	414	529	463	555	486
26	281	2.10	2.499	455	398	511	447	572	501	600	525
27	303	2.20	2.694	490	429	551	482	617	540	647	566
28	325	2.27	2.896	527	461	592	518	663	580	696	609
29	349	2.35	3.106	565	495	635	556	711	622	747	653
30	373	2.45	3.323	605	529	679	594	760	665	799	699
31	398	2.50	3.547	645	565	725	635	812	710	853	747
31.5	411	2.55	3.662	666	583	749	655	838	733	881	771
32	424	2.60	3.779	688	602	772	676	865	756	909	796
33	451	2.70	4.018	731	640	821	719	919	804	967	846
33.5	465	2.75	4.140	753	659	846	740	947	829	997	872
34	479	2.75	4.264	776	679	872	763	975	853	1027	898
35	507	2.85	4.518	822	719	923	808	1033	904	1088	952
36	537	2.95	4.779	869	761	977	855	1093	956	1151	1007
36.5	552	2.95	4.912	893	782	1004	878	1123	983	1183	1035
37	567	3.00	5.048	918	803	1031	902	1154	1010	1216	1064
38	598	3.10	5.323	968	847	1088	952	1217	1065	1282	1122
39	629	3.15	5.606	1020	892	1145	1002	1282	1122	1351	1182
40	662	3.25	5.897	1072	938	1205	1054	1348	1180	1421	1243
40.5	679	3.30	6.045	1099	962	1235	1081	1382	1209	1457	1274
41	695	3.35	6.195	1126	986	1266	1107	1416	1239	1493	1306
42	730	3.40	6.500	1182	1034	1328	1162	1486	1300	1566	1371
42.5	747	3.45	6.655	1210	1059	1360	1190	1522	1331	1604	1403

Values are indicative for guidance only

Indicative values. The tolerance value for each table is 0 / + 4% under 10 to 20% of MBL.
Please note: Other diameters with other tolerances than those illustrated can be manufactured on request.

QUALITY
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You can see a full list of our international standards on page 43.

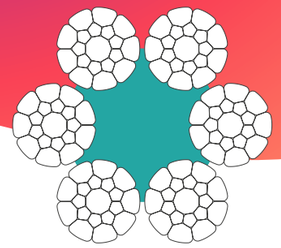
Applications

Properties

6xK19S-SPC

Altitude® SLR19

Altitude® SLR19 is a 6 strand compacted rope with an exeptionally high breaking load that is designed for chairlifts, gondolas, passenger and material cable cars and tramways. **Altitude® SLR19** is a lang lay rope engineered for high resistance to abrasion, stretching, bending and crushing.



Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
26	314	2,25	2,707	508	437	571	491	639	549	671	577
27	338	2,33	2,914	547	470	614	528	687	591	723	622
28	362	2,40	3,128	587	505	660	567	738	635	776	667
29	388	2,50	3,351	629	541	706	608	791	680	831	715
30	415	2,60	3,581	672	578	755	649	845	727	888	764
31	442	2,65	3,820	717	616	805	692	901	775	948	815
32	471	2,75	4,066	763	656	857	737	959	825	1009	867
33	500	2,85	4,319	810	697	910	783	1019	876	1072	922
34	531	2,90	4,581	859	739	966	830	1081	929	1136	977
35	562	3,00	4,850	910	783	1022	879	1144	984	1203	1035
36	594	3,10	5,128	962	827	1081	929	1210	1040	1272	1094
37	627	3,15	5,413	1015	873	1141	981	1277	1098	1343	1155
38	661	3,25	5,706	1070	921	1203	1034	1346	1158	1416	1217
39	696	3,35	6,006	1127	969	1266	1089	1417	1219	1490	1281
40	731	3,40	6,315	1185	1019	1331	1145	1490	1281	1567	1347
41	768	3,50	6,631	1244	1070	1398	1202	1564	1345	1645	1415
42	805	3,60	6,955	1305	1122	1466	1261	1641	1411	1726	1484
43	844	3,65	7,287	1367	1176	1536	1321	1719	1478	1808	1555
44	883	3,75	7,627	1431	1230	1607	1382	1799	1547	1892	1627
45	923	3,85	7,974	1496	1287	1681	1445	1881	1618	1978	1701

Values are indicative for guidance only

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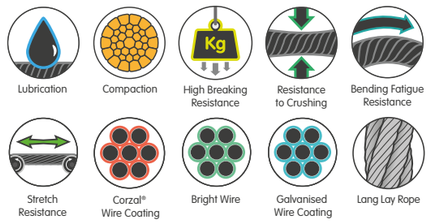
You can see a full list of our international standards on page 43.

Applications

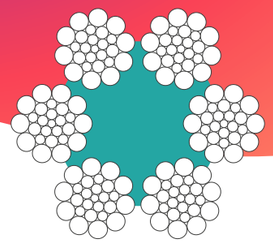
Properties

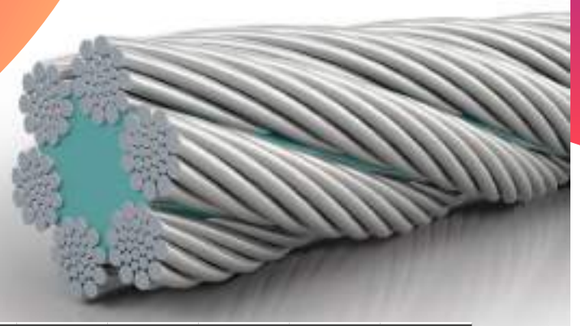


6x26WS-SPC

Altitude® WS26

Altitude® WS26 is a 6 strand rope with a high breaking load that is designed for fixed and detachable chairlifts, funitels, gondolas, passenger and material cable cars and tramways.
Altitude® WS26 is a lang lay rope engineered for high resistance to stretching, bending and crushing.





Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
27	303	2.03	2.701	490	429	551	482	617	540	649	568
28	326	2.10	2.906	528	462	593	519	664	581	699	611
29	350	2.17	3.118	566	496	636	557	712	623	750	656
30	374	2.25	3.338	606	530	681	596	762	667	803	702
31	400	2.33	3.565	648	567	727	637	814	712	858	750
32	426	2.40	3.800	690	604	775	678	868	759	914	800
33	453	2.50	4.042	734	642	825	722	923	808	972	851
34	481	2.55	4.292	780	682	876	766	980	858	1032	903
35	510	2.65	4.549	826	723	928	812	1039	909	1094	958
36	540	2.70	4.813	874	765	982	859	1099	962	1158	1013
37	570	2.80	5.085	924	808	1038	908	1162	1016	1224	1071
38	602	2.85	5.364	975	853	1095	958	1225	1072	1291	1129
39	634	2.95	5.651	1027	898	1153	1009	1291	1130	1360	1190
40	667	3.00	5.946	1080	945	1213	1062	1358	1188	1431	1252
40.5	684	3.05	6.096	1107	969	1244	1089	1392	1218	1467	1283
41	701	3.10	6.247	1135	993	1275	1116	1427	1249	1503	1315
42	735	3.15	6.557	1191	1042	1338	1171	1498	1311	1578	1381
42.5	753	3.20	6.714	1220	1067	1370	1199	1534	1342	1616	1414
43	771	3.25	6.873	1249	1093	1403	1228	1570	1374	1654	1447
44	807	3.30	7.197	1308	1144	1469	1285	1644	1439	1732	1516
45	844	3.40	7.529	1368	1197	1537	1345	1720	1505	1812	1585
46	882	3.45	7.868	1429	1251	1606	1405	1797	1573	1894	1657
47	921	3.55	8.214	1492	1306	1677	1467	1877	1642	1977	1730
48	961	3.60	8.568	1557	1362	1749	1530	1957	1713	2062	1804
49	1001	3.70	8.929	1622	1420	1823	1595	2040	1785	2149	1881
50	1043	3.75	9.298	1689	1478	1898	1661	2124	1859	2238	1958

Values are indicative for guidance only

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Applications

Chairlift, Detachable Chairlift, Gondola 2S/3S, Gondola, Funitel, Cable Car, Material Cable Car, Funicular

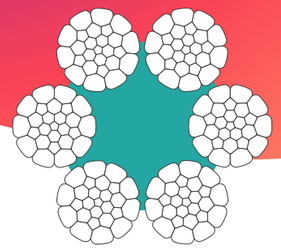
Properties

Lubrication, High Breaking Resistance, Bending Fatigue Resistance, Stretch Resistance, Corzal® Wire Coating, Bright Wire, Galvanised Wire Coating, Lang Lay Rope

6xK26WS-SPC

Altitude® WSR26

Altitude® WSR 26 is a 6 strand compacted rope with an exceptionally high breaking load that is designed for chairlifts, funitels, gondolas, passenger and material cable cars and tramways. **Altitude®WSR26** is a lang lay rope engineered for high resistance to abrasion, stretching, bending and crushing.



Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
26	306	2,03	2,667	496	427	557	479	624	536	657	565
27	330	2,13	2,874	535	460	601	517	672	578	708	609
28	355	2,20	3,089	575	494	646	555	723	621	761	655
29	380	2,27	3,312	616	530	692	595	775	666	816	702
30	407	2,35	3,543	659	567	740	637	829	713	873	751
31	434	2,45	3,781	703	605	790	680	885	761	932	801
32	463	2,50	4,028	749	644	842	724	942	810	993	854
33	492	2,60	4,282	797	685	895	770	1002	861	1055	908
34	522	2,65	4,544	845	727	950	817	1063	914	1120	963
35	553	2,75	4,813	896	770	1006	865	1126	968	1186	1020
36	585	2,80	5,091	947	815	1064	915	1191	1024	1255	1079
37	617	2,90	5,376	1000	860	1124	966	1258	1082	1325	1140
38	651	2,95	5,669	1055	907	1185	1019	1326	1141	1397	1202
39	686	3,05	5,970	1111	955	1248	1073	1397	1201	1472	1266
40	721	3,15	6,279	1168	1005	1313	1129	1469	1263	1548	1331
40,5	739	3,15	6,437	1198	1030	1345	1157	1506	1295	1587	1364
41	758	3,20	6,596	1227	1055	1379	1186	1543	1327	1626	1398
42	795	3,30	6,920	1288	1107	1447	1244	1619	1392	1706	1467
42,5	814	3,30	7,086	1318	1134	1481	1274	1658	1426	1747	1502
43	833	3,35	7,253	1350	1161	1516	1304	1697	1459	1788	1537
44	872	3,45	7,593	1413	1215	1587	1365	1776	1528	1872	1610
45	912	3,50	7,941	1478	1271	1660	1428	1858	1598	1957	1683
46	953	3,60	8,297	1544	1328	1734	1492	1941	1669	2045	1759
47	995	3,65	8,660	1611	1386	1810	1557	2026	1743	2135	1836
48	1037	3,75	9,032	1681	1445	1888	1624	2113	1817	2226	1915

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QUALITY
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Applications

Chairlift, Detachable Chairlift, Gondola 2S/3S, Gondola, Funitel, Cable Car, Material Cable Car, Funicular

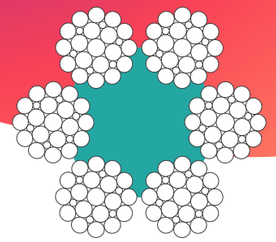
Properties

Lubrication, Compaction, High Breaking Resistance, Resistance to Crushing, Bending Fatigue Resistance, Stretch Resistance, Corzal® Wire Coating, Bright Wire, Galvanised Wire Coating, Lang Lay Rope

6x25F-SPC

Altitude® FW25

Altitude® FW25 is a 6 strand rope with a high breaking load that is designed for chairlifts, funitels, gondolas, passenger and material cable cars and tramways. **Altitude® FW25** FW25 is a lang lay rope engineered for high resistance to stretching and bending.



Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
30	378	1.95	3.369	612	536	688	602	770	674	814	712
31	404	2.00	3.600	654	572	735	643	823	720	870	761
32	431	2.07	3.839	698	610	784	686	877	768	927	812
33	458	2.15	4.086	742	650	834	730	933	817	987	864
34	487	2.20	4.340	789	690	886	775	991	868	1048	917
35	516	2.27	4.601	836	732	939	822	1051	920	1112	973
36	546	2.33	4.871	885	774	994	870	1113	974	1177	1029
37	577	2.40	5.147	935	818	1051	919	1176	1029	1243	1088
38	609	2.45	5.432	987	864	1109	970	1241	1086	1312	1148
39	642	2.55	5.724	1040	910	1168	1022	1308	1144	1383	1210
40	676	2.60	6.023	1094	958	1229	1076	1376	1204	1455	1273
40.5	693	2.65	6.176	1122	982	1261	1103	1411	1235	1492	1305
41	710	2.65	6.330	1150	1006	1292	1131	1446	1265	1529	1338
42	745	2.70	6.645	1207	1056	1356	1187	1518	1328	1605	1405
42.5	763	2.75	6.805	1236	1082	1389	1215	1555	1360	1644	1438
43	781	2.80	6.967	1266	1108	1422	1244	1592	1393	1683	1473
44	818	2.85	7.297	1326	1160	1489	1303	1667	1459	1763	1542
45	856	2.90	7.635	1387	1214	1558	1364	1744	1526	1844	1614
46	895	3.00	7.980	1450	1269	1629	1425	1823	1595	1928	1687
47	934	3.05	8.332	1514	1325	1701	1488	1904	1666	2013	1761
48	975	3.10	8.692	1579	1382	1774	1552	1986	1738	2100	1837
49	1016	3.20	9.060	1646	1440	1849	1618	2070	1811	2189	1915
50	1058	3.25	9.436	1714	1500	1926	1685	2156	1886	2279	1994
50.5	1080	3.30	9.626	1749	1530	1965	1719	2199	1924	2325	2035
51	1101	3.30	9.818	1784	1561	2004	1754	2243	1963	2372	2075
52	1145	3.40	10.209	1855	1623	2084	1823	2332	2041	2466	2158
53	1190	3.45	10.607	1927	1686	2165	1894	2423	2120	2562	2242
54	1235	3.50	11.013	2001	1751	2248	1967	2516	2201	2660	2328
55	1281	3.55	11.426	2076	1816	2332	2041	2610	2284	2760	2415
56	1329	3.65	11.847	2152	1883	2418	2116	2706	2368	2862	2504
57	1377	3.70	12.275	2230	1951	2506	2192	2804	2454	2965	2595
58	1426	3.75	12.711	2309	2021	2595	2270	2904	2541	3071	2687

Values are indicative for guidance only

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QUALITY

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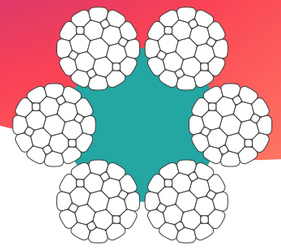
Applications

Properties

6xK25F-SPC

Altitude® FWR25

Altitude® FWR25 is a 6 strand compacted rope with an exceptionally high breaking load that is designed for chairlifts, funitels, gondolas, passenger and material cable cars and tramways. **Altitude® FWR25 is** a lang lay rope that is engineered for high resistance to abrasion, stretching, bending and crushing.



Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
30	410	2,03	3,596	665	572	747	642	836	719	884	760
31	438	2,10	3,838	709	610	797	685	892	767	943	811
32	466	2,15	4,087	755	649	848	730	950	817	1004	863
33	495	2,23	4,345	803	690	902	776	1009	868	1067	918
34	526	2,30	4,610	852	732	957	823	1071	921	1132	974
35	557	2,35	4,883	902	776	1013	872	1134	975	1199	1031
36	589	2,40	5,164	954	820	1072	922	1200	1032	1268	1091
37	622	2,50	5,453	1007	866	1132	973	1267	1089	1339	1152
38	656	2,55	5,750	1062	913	1193	1026	1336	1149	1412	1214
39	690	2,60	6,055	1118	962	1256	1081	1406	1209	1487	1279
40	726	2,70	6,368	1176	1011	1321	1136	1479	1272	1564	1345
40,5	744	2,75	6,527	1206	1037	1354	1165	1516	1304	1603	1378
41	763	2,75	6,688	1235	1062	1388	1194	1553	1336	1642	1412
42	800	2,85	7,017	1296	1115	1456	1252	1630	1401	1723	1482
42,5	819	2,85	7,184	1327	1141	1491	1282	1668	1435	1764	1517
43	838	2,90	7,353	1358	1168	1526	1312	1708	1469	1805	1553
44	878	2,95	7,698	1422	1223	1597	1374	1788	1537	1890	1625
45	918	3,05	8,050	1487	1279	1670	1436	1869	1608	1976	1700
46	959	3,10	8,411	1553	1336	1745	1501	1953	1680	2065	1776
47	1001	3,15	8,779	1621	1394	1821	1566	2039	1753	2155	1853
48	1044	3,25	9,155	1691	1454	1899	1633	2126	1828	2247	1933
49	1087	3,30	9,539	1762	1515	1979	1702	2215	1905	2342	2014
50	1132	3,35	9,931	1834	1577	2060	1772	2306	1983	2438	2097
50,5	1155	3,40	10,130	1871	1609	2102	1807	2352	2023	2487	2139
51	1178	3,45	10,331	1908	1641	2143	1843	2399	2063	2536	2181
52	1224	3,50	10,738	1983	1705	2228	1916	2493	2144	2636	2267
53	1271	3,55	11,154	2060	1771	2314	1990	2590	2227	2738	2355
54	1320	3,65	11,578	2138	1839	2402	2066	2688	2312	2842	2444
55	1369	3,70	12,009	2218	1907	2491	2143	2788	2398	2948	2535
56	1419	3,75	12,449	2299	1977	2583	2221	2890	2486	3056	2628
57	1470	3,85	12,896	2381	2048	2675	2301	2994	2575	3165	2722
58	1522	3,90	13,351	2465	2120	2770	2382	3100	2666	3277	2818

Values are indicative for guidance only

Indicative values. The tolerance value for each table is 0 / + 4% under 10 to 20% of MBL.

Please note: Other diameters with other tolerances than those illustrated can be manufactured on request.

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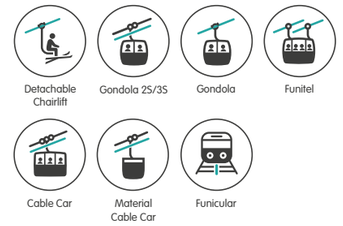
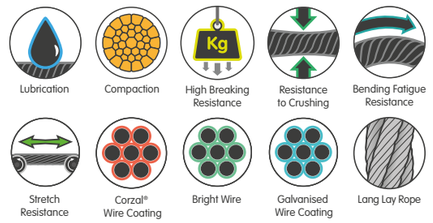
Applications



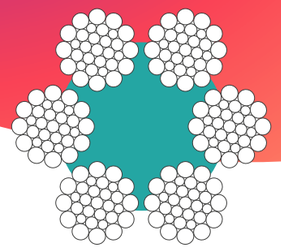
Properties

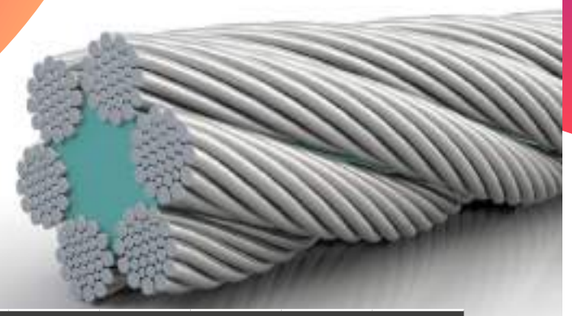


6x31WS-SPC

Altitude® WS31

Altitude® WS31 is a 6 strand rope with a high breaking load that is designed for chairlifts, funitels, gondolas, passenger and material cable cars and tramways. **Altitude® WS31** is a lang lay rope engineered for high resistance to stretching and bending.





Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
30	387	1.97	3.436	626	548	704	616	788	689	832	728
31	412	2.03	3.662	668	584	750	656	839	734	887	776
32	438	2.10	3.895	710	621	798	698	893	781	944	826
33	465	2.17	4.136	754	660	847	741	948	830	1002	877
34	493	2.23	4.384	799	699	898	786	1005	879	1062	929
35	522	2.30	4.640	846	740	950	832	1064	931	1124	984
36	552	2.35	4.903	894	782	1004	879	1124	983	1188	1039
37	582	2.40	5.174	943	825	1060	927	1186	1038	1253	1097
38	614	2.50	5.452	994	870	1117	977	1250	1093	1321	1156
39	646	2.55	5.737	1046	915	1175	1028	1315	1151	1390	1216
40	679	2.60	6.030	1099	962	1235	1081	1382	1209	1461	1278
40.5	695	2.65	6.179	1126	986	1266	1107	1416	1239	1497	1310
41	712	2.70	6.330	1154	1010	1296	1134	1451	1270	1534	1342
42	747	2.75	6.638	1210	1059	1359	1190	1522	1331	1608	1407
42.5	765	2.75	6.794	1239	1084	1392	1218	1557	1363	1646	1440
43	782	2.80	6.953	1267	1109	1424	1246	1594	1395	1684	1474
44	819	2.85	7.275	1326	1160	1490	1304	1668	1459	1762	1542
45	856	2.95	7.605	1386	1213	1558	1363	1743	1525	1842	1612
46	894	3.00	7.942	1448	1267	1627	1423	1821	1593	1924	1684
47	933	3.05	8.287	1511	1322	1697	1485	1900	1662	2008	1757
48	972	3.15	8.639	1575	1378	1769	1548	1980	1733	2093	1831
49	1013	3.20	8.998	1640	1435	1843	1613	2063	1805	2180	1908
50	1054	3.25	9.365	1707	1494	1918	1678	2147	1878	2269	1985
50.5	1075	3.30	9.551	1741	1524	1956	1712	2189	1916	2314	2025
51	1096	3.30	9.739	1776	1554	1995	1745	2233	1954	2360	2065
52	1139	3.40	10.121	1845	1615	2073	1814	2320	2030	2452	2146
53	1183	3.45	10.510	1916	1677	2153	1884	2409	2108	2546	2228
54	1227	3.50	10.907	1988	1740	2234	1955	2500	2188	2642	2312
55	1273	3.50	11.311	2062	1804	2317	2027	2593	2269	2740	2398
56	1319	3.55	11.722	2137	1870	2401	2101	2687	2351	2840	2485
57	1366	3.65	12.141	2213	1937	2487	2176	2783	2435	2941	2574
58	1414	3.70	12.567	2291	2005	2574	2252	2881	2521	3045	2664

Values are indicative for guidance only

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Applications

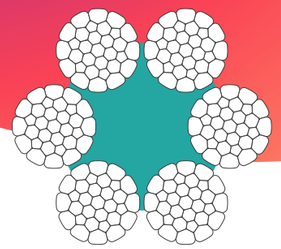
Properties

6xK31WS-SPC

ArcelorMittal

Altitude® WSR31

Altitude® WSR31 is a 6 strand compacted rope with an exceptionally high breaking load that is designed for fixed and detachable chairlifts, funitels, gondolas, passenger and material cable cars and tramways. **Altitude® WSR31** is a lang lay rope engineered for high resistance to abrasion, stretching, bending and crushing.



Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
30	408	2,03	3,568	661	568	743	639	831	715	878	755
31	435	2,10	3,808	705	607	793	682	887	763	938	806
32	464	2,17	4,056	751	646	844	726	945	813	999	859
33	493	2,23	4,312	799	687	897	772	1004	864	1062	913
34	523	2,30	4,576	848	729	952	819	1066	917	1127	969
35	554	2,37	4,847	898	772	1009	868	1129	971	1193	1026
36	586	2,45	5,127	950	817	1067	918	1194	1027	1262	1086
37	619	2,50	5,414	1003	863	1127	969	1261	1085	1333	1146
38	653	2,55	5,709	1058	910	1188	1022	1330	1144	1406	1209
39	688	2,65	6,012	1114	958	1251	1076	1401	1205	1480	1273
40	723	2,70	6,323	1171	1007	1316	1132	1473	1267	1557	1339
40,5	741	2,75	6,481	1201	1033	1349	1160	1510	1299	1596	1373
41	760	2,75	6,642	1231	1058	1382	1189	1547	1331	1635	1407
42	797	2,85	6,968	1291	1110	1450	1247	1623	1396	1716	1476
42,5	816	2,85	7,135	1322	1137	1485	1277	1662	1429	1757	1511
43	835	2,90	7,303	1353	1164	1520	1307	1701	1463	1798	1547
44	874	2,95	7,645	1417	1218	1591	1369	1781	1532	1883	1619
45	914	3,05	7,996	1481	1274	1664	1431	1863	1602	1969	1693
46	955	3,10	8,354	1548	1331	1739	1495	1946	1674	2057	1769
47	997	3,15	8,720	1616	1389	1815	1561	2031	1747	2147	1847
48	1040	3,25	9,094	1685	1449	1893	1628	2119	1822	2239	1926
49	1084	3,30	9,475	1756	1510	1972	1696	2208	1898	2333	2007
50	1128	3,35	9,865	1828	1572	2053	1766	2298	1977	2429	2089
50,5	1151	3,40	10,063	1864	1603	2095	1801	2344	2016	2478	2131
51	1174	3,45	10,263	1901	1635	2136	1837	2391	2056	2527	2173
52	1220	3,50	10,668	1977	1700	2221	1910	2485	2137	2627	2259
53	1267	3,55	11,081	2053	1766	2307	1984	2582	2220	2729	2347
54	1316	3,65	11,502	2131	1833	2394	2059	2680	2305	2833	2436
55	1365	3,70	11,931	2211	1901	2484	2136	2780	2391	2938	2527
56	1415	3,75	12,368	2292	1971	2575	2214	2882	2478	3046	2619
57	1465	3,85	12,813	2374	2042	2667	2294	2985	2567	3155	2714
58	1517	3,90	13,265	2458	2114	2761	2375	3091	2658	3267	2810

Values are indicative for guidance only

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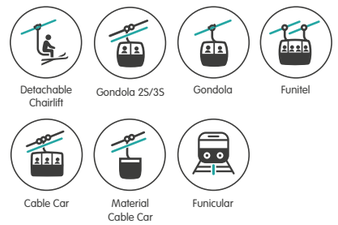
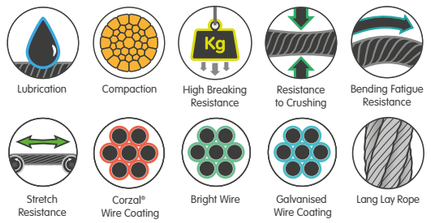
Applications



Properties

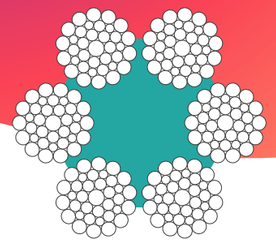


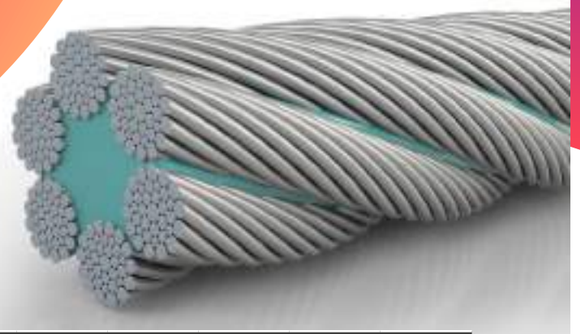
6x36WS-SPC

ArcelorMittal

Altitude® WS36

Altitude® WS36 is a 6 strand rope with a high breaking load that is designed for fixed and detachable chairlifts, funitels, gondolas, passenger and material cable cars and tramways. **Altitude® WS36** is a lang lay rope engineered for high resistance to stretching, bending and crushing.





Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
40	678	2.30	6.055	1099	961	1234	1080	1382	1209	1464	1281
40.5	695	2.33	6.207	1126	986	1265	1107	1416	1239	1501	1313
41	713	2.35	6.361	1154	1010	1297	1135	1451	1270	1538	1346
42	748	2.40	6.674	1211	1060	1361	1191	1523	1333	1614	1412
42.5	766	2.45	6.834	1240	1085	1393	1219	1559	1365	1653	1446
43	784	2.45	6.996	1270	1111	1426	1248	1596	1397	1692	1480
44	821	2.50	7.324	1329	1163	1493	1307	1671	1462	1771	1550
45	858	2.55	7.661	1390	1217	1562	1367	1748	1530	1853	1621
46	897	2.65	8.005	1453	1271	1632	1428	1827	1598	1936	1694
47	936	2.70	8.356	1517	1327	1704	1491	1907	1669	2021	1768
48	976	2.75	8.715	1582	1384	1777	1555	1989	1740	2108	1844
49	1017	2.80	9.082	1648	1442	1852	1620	2073	1814	2197	1922
50	1059	2.85	9.456	1716	1502	1928	1687	2158	1888	2287	2001
50.5	1081	2.90	9.646	1751	1532	1967	1721	2201	1926	2333	2042
51	1102	2.90	9.838	1786	1562	2006	1755	2245	1965	2380	2082
52	1146	3.00	10.227	1856	1624	2085	1825	2334	2042	2474	2165
53	1190	3.05	10.624	1928	1687	2166	1896	2425	2122	2570	2249
54	1236	3.10	11.029	2002	1751	2249	1968	2517	2202	2668	2334
55	1282	3.15	11.441	2076	1817	2333	2041	2611	2285	2767	2421
56	1329	3.20	11.860	2153	1884	2418	2116	2707	2368	2869	2510
57	1377	3.25	12.287	2230	1951	2506	2192	2804	2454	2972	2601
58	1425	3.30	12.722	2309	2020	2594	2270	2903	2541	3077	2693
59	1475	3.40	13.164	2389	2091	2684	2349	3004	2629	3184	2786
60	1525	3.45	13.614	2471	2162	2776	2429	3107	2719	3293	2882
61	1577	3.50	14.071	2554	2235	2869	2511	3211	2810	3404	2978
62	1629	3.55	14.536	2638	2309	2964	2594	3318	2903	3516	3077
63	1682	3.60	15.009	2724	2384	3061	2678	3425	2997	3631	3177
64	1735	3.65	15.489	2811	2460	3158	2764	3535	3093	3747	3278
65	1790	3.70	15.976	2900	2537	3258	2851	3646	3191	3865	3382
66	1846	3.80	16.471	2990	2616	3359	2939	3759	3289	3985	3486

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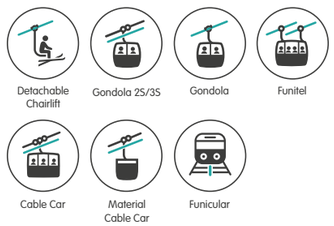
Applications



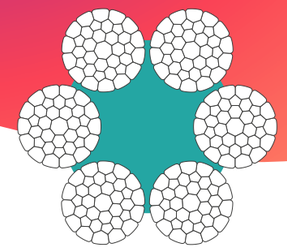
Properties

6xK36WS-SPC

ArcelorMittal

Altitude® WSR36

Altitude® WSR36 is a 6 strand compacted rope with an exceptionally high breaking load that is designed for fixed and detachable chairlifts, funitels, gondolas, passenger and material cable cars and tramways. **Altitude® WSR36** is a lang lay rope engineered for high resistance to stretching, bending and crushing.



Diameter	Section	ØExt-wire	Mass	Minimum breaking load							
mm	mm²	mm	Kg/m	1570 MPa		1770 MPa		1960 MPa		Max MPa	
				Total	MBL	Total	MBL	Total	MBL	Total	MBL
38	652	2,23	5,722	1056	908	1186	1020	1328	1142	1407	1210
39	686	2,30	6,024	1111	956	1249	1074	1398	1202	1482	1274
40	721	2,35	6,334	1169	1005	1313	1129	1469	1264	1558	1340
40,5	739	2,37	6,492	1198	1030	1346	1157	1506	1295	1596	1373
41	757	2,40	6,652	1227	1055	1379	1186	1543	1327	1636	1407
42	795	2,45	6,977	1287	1107	1446	1244	1618	1392	1716	1475
43	832	2,55	7,310	1349	1160	1515	1303	1696	1458	1797	1546
44	871	2,60	7,651	1411	1214	1586	1364	1775	1526	1881	1618
45	911	2,65	8,000	1476	1269	1658	1426	1856	1596	1967	1692
46	952	2,70	8,357	1542	1326	1732	1489	1938	1667	2055	1767
47	993	2,75	8,722	1609	1384	1807	1554	2023	1740	2144	1844
48	1035	2,85	9,094	1677	1443	1885	1621	2109	1814	2236	1923
49	1079	2,90	9,474	1748	1503	1963	1688	2197	1890	2329	2003
50	1123	2,95	9,862	1819	1564	2044	1758	2287	1967	2424	2085
50,5	1145	3,00	10,059	1855	1596	2084	1793	2333	2006	2473	2127
51	1168	3,00	10,258	1892	1627	2126	1828	2379	2046	2522	2169
52	1214	3,05	10,662	1967	1691	2209	1900	2473	2127	2621	2254
53	1261	3,10	11,074	2042	1756	2295	1973	2568	2209	2722	2341
54	1309	3,20	11,493	2120	1823	2381	2048	2665	2292	2825	2429
55	1357	3,25	11,921	2199	1891	2470	2124	2764	2377	2930	2520
56	1407	3,30	12,356	2279	1960	2560	2202	2865	2464	3037	2612
57	1457	3,35	12,799	2360	2030	2652	2281	2968	2553	3146	2705
58	1508	3,40	13,250	2444	2101	2745	2361	3073	2642	3256	2800
59	1561	3,50	13,708	2528	2174	2840	2443	3179	2734	3369	2897
60	1614	3,55	14,175	2614	2248	2937	2526	3287	2827	3484	2996
61	1668	3,60	14,649	2702	2323	3035	2610	3397	2921	3600	3096
62	1723	3,65	15,131	2791	2400	3135	2696	3509	3018	3719	3198
63	1778	3,70	15,622	2881	2478	3237	2783	3622	3115	3839	3301
64	1835	3,80	16,119	2973	2556	3340	2872	3738	3215	3961	3407

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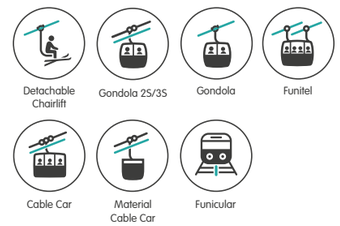
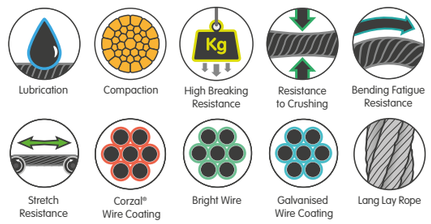
Applications



Properties

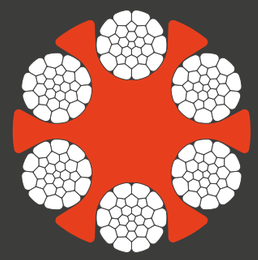


Whisper®

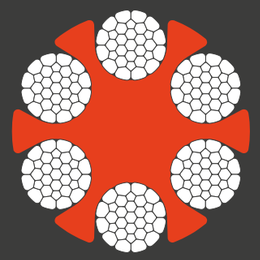
Highly reliable, Whisper® is a new breed of ropeway rope that reduces vibration and noise levels, optimising passenger comfort.

The outer circumference of Whisper® offers a smooth interface between the rope and sheaves, clamps and rollers.

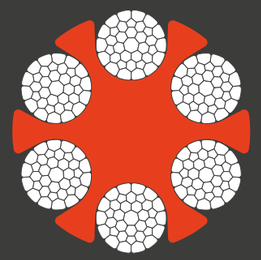
Compacted Rope



Whisper® 6x26WSR



Whisper® 6x31WSR



Whisper® 6x36WSR

ArcelorMittal

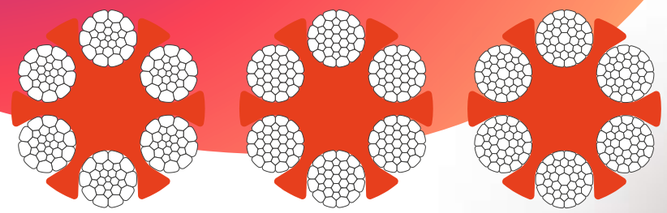
ArcelorMittal ROPES
ENGINEERING EXCELLENCE

ArcelorMittal

Whisper®

A new breed of ropeway rope that reduces vibration and noise levels

The outer circumference of **Whisper®** offers a smooth interface between the rope and sheaves, clamps and rollers.



Whisper® 6x26WSR

Whisper® 6x31WSR

Whisper® 6x36WSR

Features

- Compacted strand.
- Wire class compositions from 1770 to 2160 MPa.
- Splice.
- Pitch length remains unchanged.
- With CE certification, the Whisper® splice is specially developed to optimise its lifespan.
- The double-butted strands provide a lifespan that extends far beyond a standard splice.
- Controlling the inner-strand space reduces the contact forces between wires.

Construction	Diameter	Section	Mass	Minimum Breaking load
	mm	mm²	Kg/m	Kn
6x26WSR	30	366	3,3	675
6x26WSR	32	416	3,7	768
6x26WSR	34	470	4,2	867
6x26WSR	36	527	4,7	972
6x26WSR	38	587	5,2	1084
6x26WSR	40,5	656	5,9	1211
6x31WSR	42	702	6,3	1299
6x31WSR	44	770	6,9	1426
6x31WSR	46	842	7,5	1558
6x31WSR	48	916	8,2	1697
6x31WSR	49	975	8,7	1806
6x31WSR	50	994	8,9	1841
6x36WSR	52	1074	9,7	1996
6x36WSR	54	1158	10,5	2151
6x36WSR	56	1245	11,2	2313
6x36WSR	58	1335	12,1	2475
6x36WSR	60	1429	12,9	2617
6x36WSR	62	1526	13,8	2779
6x36WSR	64	1626	14,7	2953

Values are indicative for guidance only

Please note: Other diameters with other tolerances than those illustrated can be manufactured on request.
Indicative values. The tolerance value for each table is 0 / + 4% under 10 to 20% of MBL.

Benefits

Suitable for track/hauling ropes.

The core fins fill the inter strand spaces to improve comfort of use and operation.

Enhanced resistance and lifespan due to compacted strand (lifetime of spliced loop 30% longer than a standard cable).

Adapts to your existing systems.

Significant reduction in maintenance costs.

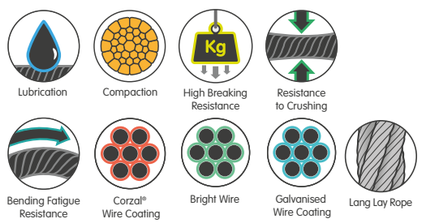
Bandage wear less on a conventionalcable.

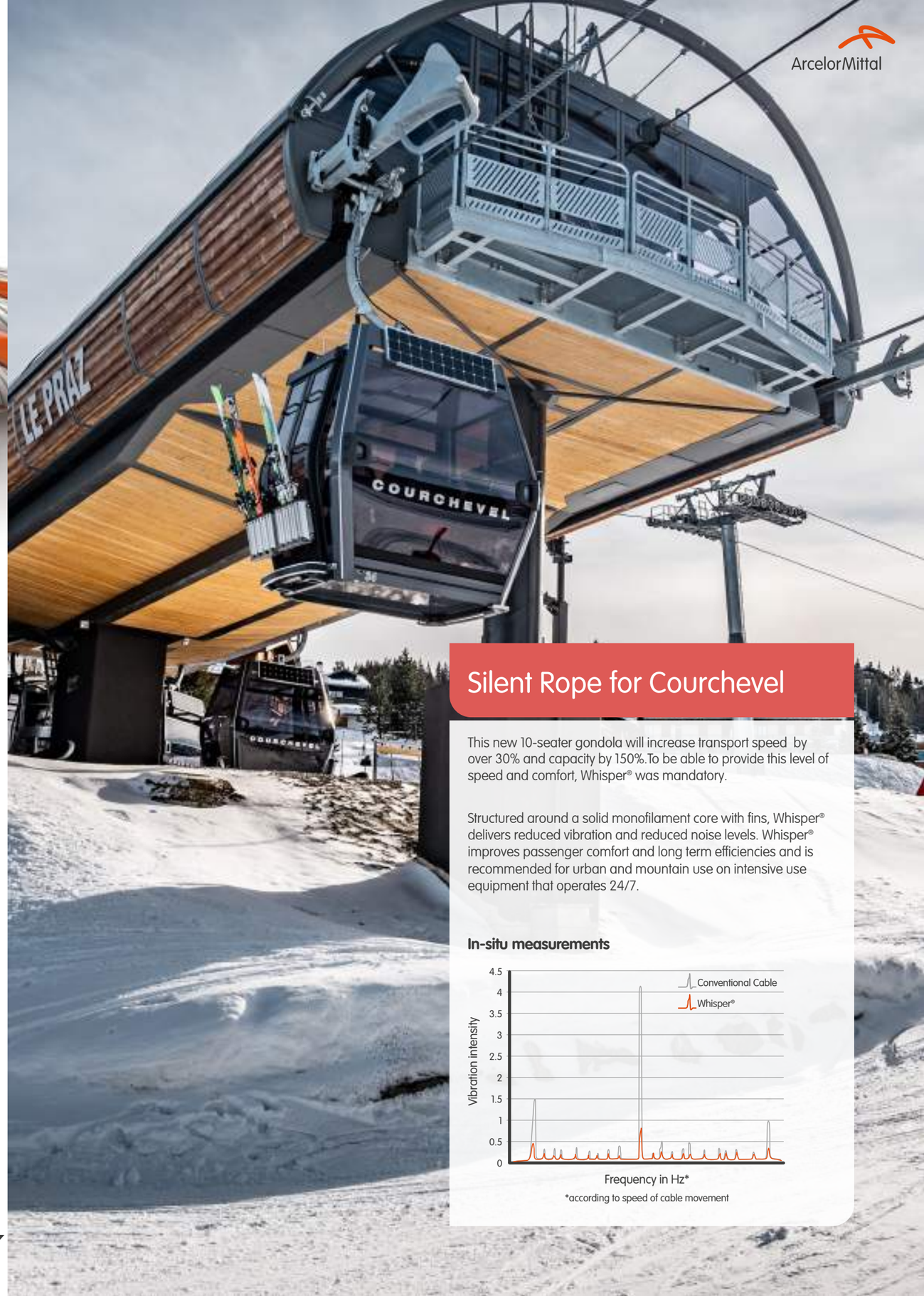
Whisper® is recommended for use on intensive use equipment that operates 24/7, especially for urban or mountain region rope transport systems.

Significant reduction of noise.

Applications

Properties





ArcelorMittal

Silent Rope for Courchevel

This new 10-seater gondola will increase transport speed by over 30% and capacity by 150%.To be able to provide this level of speed and comfort, Whisper® was mandatory.

Structured around a solid monofilament core with fins, Whisper® delivers reduced vibration and reduced noise levels. Whisper® improves passenger comfort and long term efficiencies and is recommended for urban and mountain use on intensive use equipment that operates 24/7.

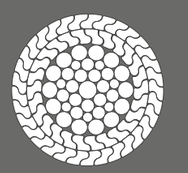
In-situ measurements

*according to speed of cable movement

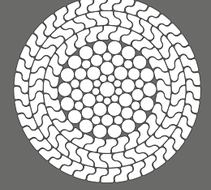
OverSky®

ArcelorMittal ROPES has developed a Full Locked Coil (FLC) track rope specifically for the highly demanding applications of aerial and passenger transportation.

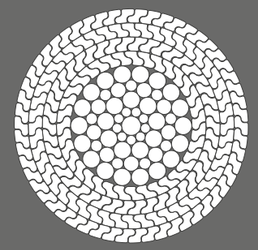
The compacted and densely concentrated metallic structure of the FLC track rope guarantees a higher breaking load. The outer interlocking "Z" shaped layers give the rope a smoother profile, reducing fatigue caused by the interface between rope and sheaves, rollers and clamps.



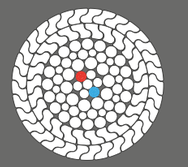
FLC 2Z
p.36



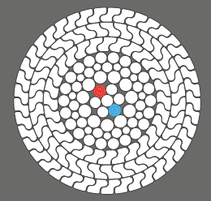
FLC 3Z
p.36



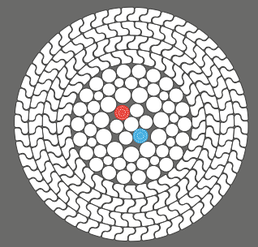
FLC 4Z
p.36



FLC 2Z-FO
p.37



FLC 3Z-FO
p.37



FLC 4Z-FO
p.37

ArcelorMittal

Rangeuil Hospital-Oncopole-Paul Sabatier University-Toulouse

The transport system that was once regarded as belonging only to the ski slopes is increasingly becoming part of the urban landscape.

With an estimated 8,000 passengers every day, the new Téléo cable car will cover 3 kilometers in 10 minutes with its 15 cabins to connect Rangueil Hospital, the Oncopole and Paul Sabatier University.

Serving an urban space, our state of the art full locked coil solutions with optic fibres allows a quick communications between stations and a smooth interface between the cabines and the ropes for a comfortable ride!

What ArcelorMittal ROPES delivered:

Track Ropes
Diameter: Ø58 mm Full Locked Coil ropes with optic fibres
Composition: Galvanised wires, 3 layers of Z-wire with 12 optical fibres core
Length: 3605 m galvanised, installed in 4 sections

Hauling Ropes
Diameter: Ø49 mm haul ropes
Composition: Whisper®
Length: 6365 m

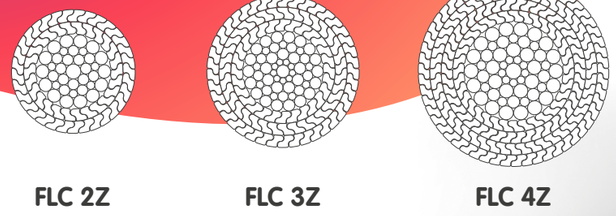
Services
Project consultancy
Specification recommendations
Local team training

ArcelorMittal ROPES
ENGINEERING EXCELLENCE

OverSky®

Precision engineered for highly demanding applications

The compacted and densely concentrated metallic cross section of the FLC track rope guarantees a higher breaking load whilst the outer interlocking "Z"-shaped layers give the rope a smoother profile, reducing fatigue caused by the interface between rope and sheaves and rollers.



FLC 2Z **FLC 3Z** **FLC 4Z**

Features

- Bespoke design available on request.
- Parallel core available on request.
- Sacrificial coating for corrosion resistance.

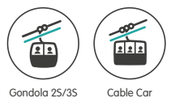
Diameter	Section	Mass	Minimum breaking load					
			1570 MPa		1770 MPa		1960 MPa	
mm	mm²	kg/m	Total	MBL	Total	MBL	Total	MBL
30	609	5,088	987	863	1108	970	1164	1018
32	695	5,806	1125	985	1264	1106	1330	1163
34	785	6,563	1272	1113	1429	1250	1506	1317
36	881	7,357	1426	1248	1603	1402	1692	1480
38	981	8,190	1589	1390	1785	1562	1888	1652
40	1086	9,061	1760	1540	1977	1730	2095	1833
42	1197	9,971	1939	1696	2178	1906	2312	2023
44	1312	10,919	2125	1860	2388	2089	2540	2222
46	1432	11,905	2320	2030	2607	2281	2777	2430
48	1557	12,929	2523	2208	2834	2480	3026	2648
50	1730	14,449	2802	2452	3148	2754	3312	2898
52	1863	15,589	3018	2641	3390	2967	3572	3125
54	2002	16,764	3243	2838	3644	3188	3844	3363
56	2147	17,973	3478	3044	3908	3419	4127	3611
58	2298	19,217	3723	3258	4183	3660	4423	3871
60	2455	20,495	3977	3480	4468	3910	4732	4140
62	2618	21,808	4241	3711	4765	4169	5052	4420
64	2787	23,155	4515	3950	5072	4438	5385	4712
66	3029	25,274	4907	4294	5513	4824	5796	5072
68	3209	26,751	5198	4548	5840	5110	6145	5377
70	3391	28,251	5494	4807	6172	5401	6502	5689
72	3577	29,776	5795	5071	6511	5697	6866	6007
74	3767	31,325	6103	5340	6856	5999	7237	6332

Values are indicative for guidance only

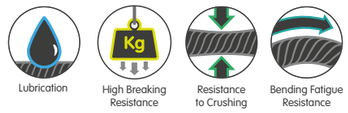
Indicative values. The tolerance value for each table is -/+ 2%.

Please note: Other diameters with other tolerances than those illustrated can be manufactured on request.

Applications



Properties



OverSky®

Precision engineering with integrated fibre optics

The fibre optic version of this advanced innovation combines all the benefits of the FLC track rope with integrated fibre optics.

FLC 2Z-FO **FLC 3Z-FO** **FLC 4Z-FO**

Features

- Bespoke design available on request.
- Parallel core available on request.
- Sacrificial coating for corrosion resistance.

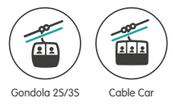
Diameter	Section	Mass	Minimum breaking load					
			1570 MPa		1770 MPa		1960 MPa	
mm	mm²	kg/m	Total	MBL	Total	MBL	Total	MBL
30	593	4,996	960	816	1079	917	1129	960
32	678	5,739	1098	933	1234	1049	1294	1100
34	766	6,493	1241	1055	1394	1185	1465	1245
36	858	7,257	1389	1181	1561	1327	1643	1397
38	952	8,033	1543	1311	1733	1473	1828	1554
40	1050	8,820	1701	1446	1911	1625	2020	1717
42	1151	9,617	1865	1585	2095	1781	2218	1885
44	1256	10,425	2034	1729	2285	1942	2423	2060
46	1412	11,740	2287	2001	2569	2248	2736	2394
48	1537	12,764	2490	2179	2797	2448	2983	2610
50	1709	14,284	2769	2423	3111	2722	3270	2861
52	1842	15,424	2985	2612	3353	2934	3530	3089
54	1982	16,599	3210	2809	3607	3156	3802	3326
56	2127	17,808	3445	3015	3871	3387	4085	3575
58	2278	19,052	3690	3229	4146	3627	4381	3834
60	2435	20,330	3944	3451	4431	3877	4690	4103
62	2598	21,643	4208	3682	4728	4137	5010	4384
64	2766	22,991	4482	3921	5035	4406	5343	4675
66	3009	25,110	4875	4265	5476	4792	5753	5034
68	3188	26,586	5165	4519	5803	5077	6103	5340
70	3371	28,087	5461	4778	6135	5368	6460	5653
72	3557	29,611	5762	5042	6474	5665	6825	5971
74	3747	31,160	6070	5311	6819	5966	7196	6297

Values are indicative for guidance only

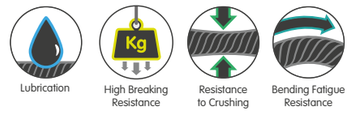
Indicative values. The tolerance value for each table is -/+ 2%.

Please note: Other diameters with other tolerances than those illustrated can be manufactured on request.

Applications



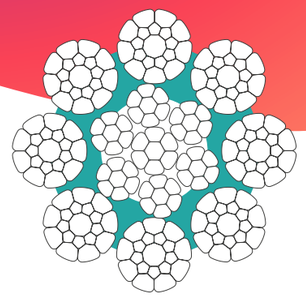
Properties



HP8P/8xK19S

8 outer strands, plastic impregnation

Our ropes for slope groomers offer high flexibility and performance. HP8P ropes have a high breaking load and their construction allows them to resist the highest pressures on the winch, perfect for intensive use and long life performance.



Features

Plastic impregnation of the core between outer strands improving the rope behaviour incase of heavy duty applications (fleet angles, winding /unwinding cycles).

Independent plastic impregnated steel core.

HP8P/8xK19S/2018/v1.0

Diameter		Section	Miass		Minimum breaking load
mm	inch	mm²	kg/m		**2160 MPa**
10	-	56.51	56.51	0.50	103
11	7/16	67.84	67.84	0.60	124

Values are indicative for guidance only

Indicative values. The tolerance value for each table is (0/+5%).

Please note: Other diameters with other tolerances than those illustrated can be manufactured on request.

Benefits

> The plastification maintains lubrication inside the core.

> The plastification supports the wire rope integrity

> Excellent multi layer winch winding behaviour and capston system.

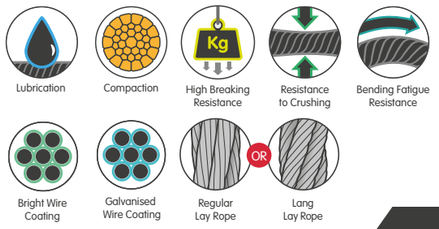
QUALITY

ArcelorMittal ROPES operates an internal DNV-Certified Quality Assurance System which complies with the requirements of ISO 9001.

Our production plant in Bourg-en-Bresse is certified OHSAS 18001 for safety management.

You can see a full list of our international standards on page 43.

Properties



Long life performance for Les Arcs. France

Slope groomers equipped with HP8P winch ropes in Les Arcs ski resort, are achieving a service life in excess of 1200 hours.

The special and dedicated construction, associated to the compacted 8 strands together with the plastic impregnation around the steel core, provide high resistance to contact pressure making the HP8P perfect for intensive use.

With excellent flexibility through the pulley and capstan rotating system, exceptional multi layer winch winding behaviour and a high breaking load, the HP8P is the optimal choice for the winch snow groomers to keep the pistes in top condition.

ArcelorMittal ROPES
ENGINEERING EXCELLENCE

Installation and repair services

ArcelorMittal

ArcelorMittal Bourg-en-Bresse has a deep cooperation with TEC Câbles Bourg. They ensure all implementation work, repair and maintenance of wire ropes all over the world.

TEC Câbles Bourg aims to develop specialised services for all customers based on its high reactivity, quality of service and ability to adapt to the market and all technological new developments.

TEC Câbles Bourg uses its know-how for:

- Unfolding/unwinding and changing cables.
- Splicing and shortening cables.
- Rope operation/handling: sliding, raising carrying ropes,
- Socketing.
- All other cable operations: strands and/or sections replacement, repairs, etc.

Installation

In partnership with ArcelorMittal, TEC Câbles have developed specific technology to enable quicker installation of any wire rope, on both new and old installations, whilst ensuring the highest levels of safety at all times.

Caterpillar winch

- Pulling/breaking winch (no twist or flexion induction compared to capstan winch)
- 15 tonnes capacity with safety factor of 3 (ultimate tension 45 tonnes)
- High unwinding speed of 1000m/h (pulling or breaking mode)
- No risk of mechanical deformation thanks to specific low pressure even at max capacity (<10 MPa). Also suitable with sheathed cables and Whisper®.
- Full dashboard functionality provides live measurements ensuring complete traceability during the whole process (length, speed, pulling or holding force, pressure on the rope)
- Diameter from 0 up to 80mm, stranded ropes or Full Locked Coil ropes
- Design of the winch allows the pulling of wire rope that is already socketed
- Full system is stand alone requiring no power or network connections
- Full mobile system that can be transported in a 20' container

Multimodal TEC Câbles truck:

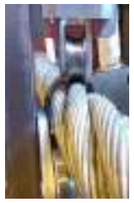
The investment in a new multimodal Mecamont truck is enabling TEC Câbles to offer improved solutions and a better response to customers, even in the most extreme of environments.

- 25 tonnes capacity hydraulic crane
- Maximum jib height of 20m
- Holding capstan of 15 tonnes
- Unwinding speed 1000m/h for ropes up to 50mm

ArcelorMittal

Splicing recommendations

TEC Câbles maintains a team of highly qualified engineers and splicers dedicated to installing ropes, enabling us to provide a total solution. The tools used by TEC Câbles ensure the splicing process is efficient, ergonomic and effective, resulting in extended life time of the wire rope.



Distribution wrench

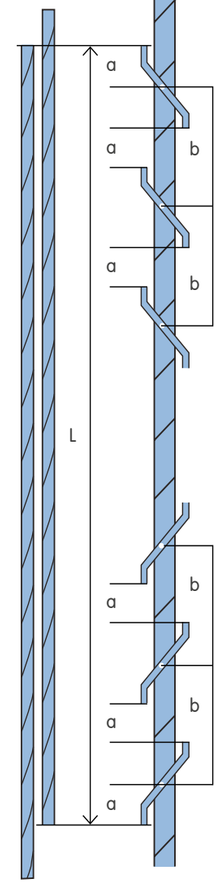
Developed to facilitate and control the splicing operation, this tool provides regular distribution of the strand ensuring complete uniformity of shape and lay of all 12 spliced strands.

Strands equalization wheel

Performed at the end of the splicing process, the strands equalization wheel guarantees perfect angular positioning of the 6 strands on each side of the knot. This ensures no contact, and therefore no friction takes place between the strands and positively affects the longevity of the wire rope.

Recommendations CEN

Diameter	L=1200 D	a=60 D	b=180D
mm	m	m	m
12	14.4	0.72	2.16
14	16.8	0.84	2.52
16	19.2	0.96	2.88
18	21.6	1.08	3.24
20	24.0	1.20	3.60
22	26.4	1.32	3.96
24	28.8	1.44	4.32
26	31.2	1.56	4.68
28	33.6	1.68	5.04
30	36.0	1.80	5.40
32	38.4	1.92	5.76
34	40.8	2.04	6.12
36	43.2	2.16	6.48
38	45.6	2.28	6.84
40	48.0	2.40	7.20
42	50.4	2.52	7.56
44	52.8	2.64	7.92
46	55.2	2.76	8.28
48	57.6	2.88	8.64
50	60.0	3.00	9.00
52	62.4	3.12	9.36
54	64.8	3.24	9.72
56	67.2	3.36	10.08
58	69.6	3.48	10.44
60	72.0	3.60	10.80
62	74.4	3.72	11.16
64	76.8	3.84	11.52



" TEC Câbles team is fully dedicated to fullfiling your needs with regards to splices, controls, advice and repairs. Our team is always available , at any time of the year and all around the world."

Etienne Maublanc
Head of TEC Câbles

ArcelorMittal

Technical Information

Technical Information

Our commitment

ArcelorMittal Bourg-en-Bresse controls all the essential parameters for the correct production of special high performance ropes used in the aerial transport of people and materials: suitable specific equipment, an approved production process, a systematic check on raw material, an inspection system and traceability at each stage of production, trained and experienced specialists.

ArcelorMittal Bourg-en-Bresse runs an internal DNV-Certified Quality Assurance System complying with the requirements of ISO 9001.

As a result of its continuous improvement process, the plant is also certified OHSAS 18001 for safety management.

International specifications

USA	ANSI B77 1
CANADA	CAN/CSA Z98-01
FRANCE	EU EN 12385-8 EU EN 12385-9 EN 12927
SWITZERLAND	Ordonnances Fédérales
ITALY	DM 1175 - DD 144 EU EN 12385-8 EU EN 12385-9
SPAIN	B.O.E 293 EU EN 12385-8 EU EN 12385-9
AUSTRIA	DSB 80 – Örnorm 9500
GERMANY	BO-Seil und BO-Schlepp
EUROPE	CEN/ EN 12385-8 EN 12385-9 EN 12927-3

ArcelorMittal ROPES
ENGINEERING EXCELLENCE

Technical Information

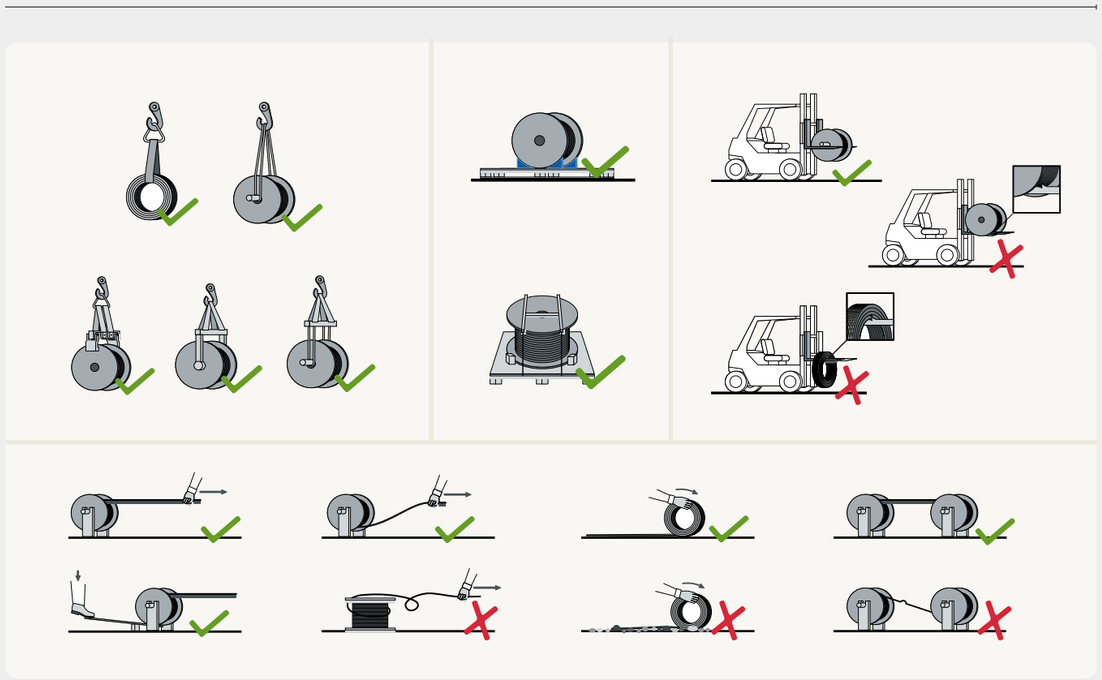
Recommendations

Storage and maintenance

The rope must be adequately maintained and regularly lubricated, as often as it is necessary, but at least when the rope works in extreme conditions and before/after prolonged inactivity. The lubricant must be compatible with the original grease. Before re-lubrication, the wire rope must be dry and cleaned by scraping or using a cryogenic spray. Cleaning by cloth, high pressure cleaner or solvents is forbidden.

When stored, the rope should be kept in a dry and ventilated environment with no direct contact with the floor and an air flow under the reel. Visual inspection is necessary before the use of a stored wire rope. In case of doubt of the quality of the wire rope, we can help you to find and make additional inspection analysis.

EWRIS handling recommendations



At all times, contact of the rope with any metallic pieces should be avoided to prevent early damage.

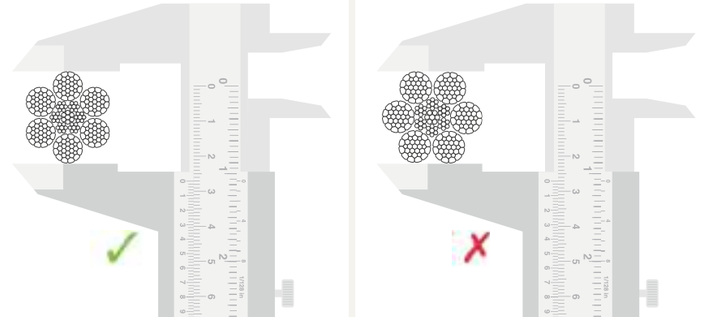
EWRIS
European Federation of Steel Wire Rope Industries

Dimensional control

Diameter (NF EN 12385-1)

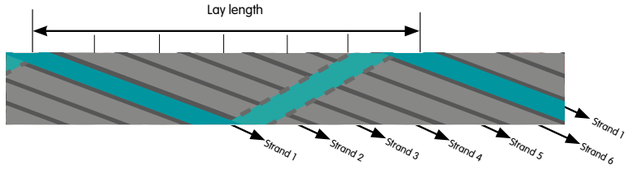
The diameter must be measured with an appropriate measuring instrument covering at least 2 strands.

Measurements must be made at two positions spaced at least one metre apart and for each position, 2 measurements must be taken at right angles.



Lay Length

On ropes dedicated to people transportation, lay length is a very important parameter.
Lay length is the distance measured parallel to the centre line of a wire rope in which a strand makes one complete spiral or turn around the rope.
If the lay length is not well defined or modified during the installation phase or during utilisation, the rope can generate some vibrations on the pillar or others elements of the structure.



Checking the lay length is a quite complicated operation. We recommend the following process :

1. Stick a paper strip on the rope. The paper strip should be pulled tight.
2. Draw a thin straight line on it using a corner piece. This line will represent the rope axis.
3. Using a chalk stick, identify the track of the rope.
4. Remove the paper strip from the rope.
5. Make the measurement directly on the paper strip.

Remark: the paper strip can be stored for further investigations.

The lay length should ideally be measured on 5 lay lengths minimum.

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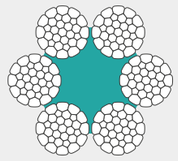
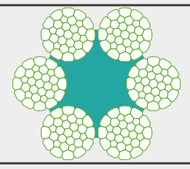
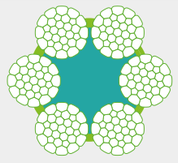
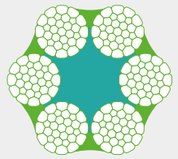
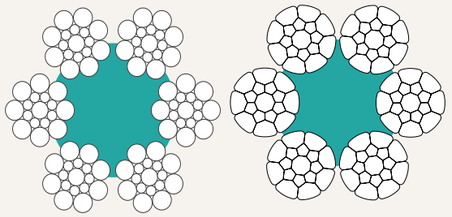
Lubrication for hauling ropes

Type of Lubrication	Lubrication Method		% mass	Note	Illustration
Dry	Closing	No grease slight oil only	0.0	For stainless wire ropes and specific demands (oil is applied to avoid trouble in the die during assembly)	
	Stranding				
A-1	Closing	No grease, oil only	0.5	For ropeway ropes, mining ropes on Koepe sheave and plastified wire ropes	
	Stranding	Lubrication + tight wipe			
A-3	Closing	Lubrication + wipe	1.5 - 1.75	Hoisting applications	
	Stranding	Lubrication + wipe			
A-4	Closing	Lubrication + wipe	2.0 - 2.5	Not available direct from the mill. (Can be performed by our distributors on specific demand)	
	Stranding	Lubrication + wipe			

Please note that the lubricant must be compatible with the rubber used on the pulleys

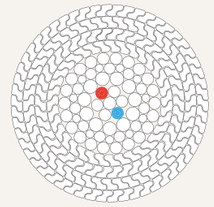
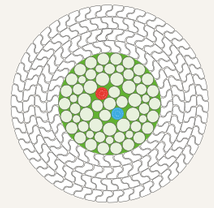
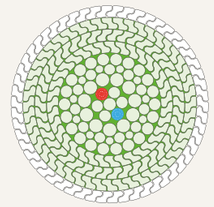
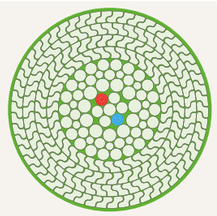
Compaction

Thanks to the rope compaction, the metallic section is increased, which leads to a higher breaking load than a non compacted wire rope of the same diameter. The outside strand area is also increased and smoother, which decreases the contact pressure between the rope and the drum/sheaves, and thus increases the fatigue properties.



Round Wire Rope | Compacted Rope

Lubrication for Full Locked Coil ropes

Type of Lubrication	Lubrication Method		% mass	Note	Illustration
Dry	Core	No grease Slight oil	0%	Stainless wire ropes and specific demends	
	Z Layer				
	Outer Shape				
A-1	Core	+	0.30%	Specific demands for indoor applications	
	Z Layer	-			
	Outer Shape	-			
A-2	Core	+	1%	Ropeway ropes	
	Z Layer	+			
	Outer Shape	-			
A-3	Core	+	1.15%	Ropeway ropes in aggressive environments	
	Z Layer	+			
	Outer Shape	+			

Crush resistance

Crushing is the effect of external pressure on a rope which damages the rope by distorting the cross-sectional shape of the rope, its strands, core or all three. Crush resistant ropes withstand or resist external forces.

Technical Information

Groove characteristics for sheaves, saddle and grooved drums

Grooves in sheaves and drums should be circular and smooth.

Sheaves

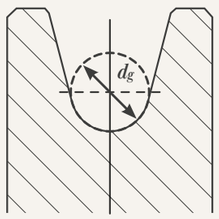
To ensure good support, the rope must contact the groove for approx 130-140° of arc, which leads to the following recommendation for the groove diameter:

$$1.05d < d_g < 1.1d$$

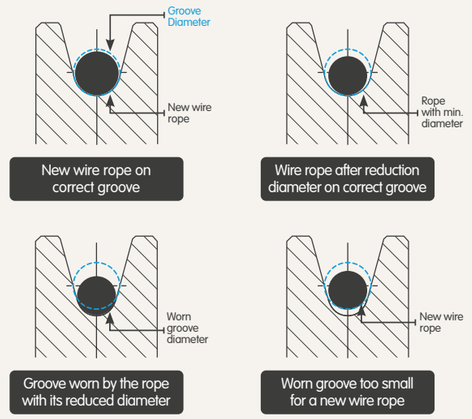
$$Optimal\ value = 1.075$$

With:

- d = nominal rope diameter with 0/+4% tolerances;
- d_g = groove diameter.



During a wire rope's lifetime, the rope diameter will decrease. This is due first to the elongation of the rope, and then the wear on the rope wires. This diameter variation begins quickly but then slows down. The wire rope will create a new groove in the sheave which corresponds to the reduced diameter. If a new wire rope is installed in a worn sheave, without resurfacing, the new rope will wear more quickly. The lifetime can be divided by 10.



Grooved drums

The groove diameter d_g and the pitch diameter p must comply with the following criteria:

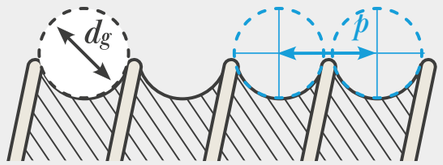
$$d_g = 1.0173d$$

$$1.035dg < p < 1.09dg$$

$$Optimal\ value = 1.06$$

With:

- d = rope diameter under tension of 5%MBL
- d_g = groove diameter
- p = pitch between 2 grooves



Test resources

Wire

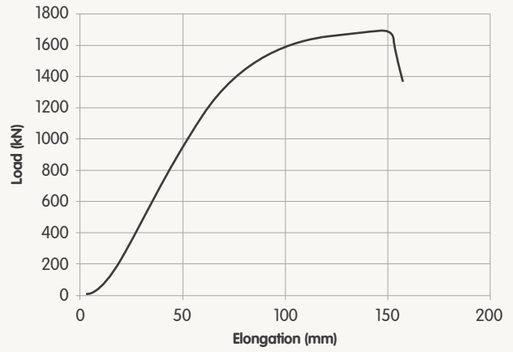
Prior to the manufacture of our ropes, a sample is taken from each wire spool and tested according to the international standards:

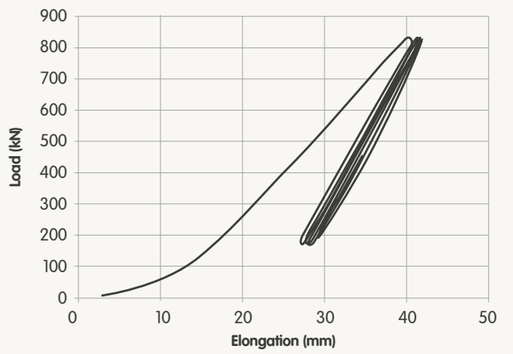
- Tensile test
- Torsion test
- Bending test

Wire rope

For each manufactured wire rope, the breaking load is checked with a test. During this test, the stress/strain curve is recorded and a modulus measurement can be made on request.

The Bourg-en-Bresse site has 3 test benches: 200 tons, 350 tons and 1500 tons.





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Fatigue Testing: Lutèce

In association with our partners, Mécamont and TEC Câbles, we have developed and invested in a 120m test bench, capable of simulating speeds of up to 20 metres per second on cables from 30-60mm in diameter. This test simulates a cable lifespan of 25 years in just 2 months.

Our whole production process is part of a continuous control system which includes breaking strength testing, radial deformation and diameter reduction measuring.

It is out of these rigorous monitoring processes that the "Lutèce Project" was born to fulfil the need to create products at the forefront of technology, able to respond to important changing market requirements.

Together, we are setting the performance benchmarks for the future.

Operational since the beginning of 2019, our latest product innovations have been tested on the Lutèce bench to ensure we are providing our customers with reliable solutions.

Installation and maintenance

Choosing the right rope

The characteristics listed in the tables featured in this catalogue correspond to usual levels of performances. They are given for information purposes only and have no contractual value. We recommend you contact our team and check that the rope characteristics comply with regulatory and technical requirements, as these may vary according to national codes or the particular specifications of constructors.

We pay careful attention to what our clients have to say and are, as far as possible, ready to adapt our product design to fit your exact project requirements or to upgrade rope performances compared to existing products. Parameters such as breaking strength, length of lay, rope diameters adequately adjusted to attachment geometries and choice have to be assessed during a contract review and be part of written agreements related to this contract.

Rope assembly and maintenance

a) Packing and storing

The ropes are wound in the factory on metal or wooden reels designed for handling in the horizontal axis position with appropriate means.

Care should be taken:

- To avoid the inversion of the reel.
- To prevent the rope coming into contact with parts liable to damage it through shock, friction or chemical pollution corrosion risks. The rope must not come into contact with the ground.
- To prevent any risk of fire exposure (blow torch) or electric contact (no earth clamp on the rope when using a welding post).

The rope may be stored for a long period provided that its qualities and protection system are maintained.

b) Installing the rope

These operations must be carried out by experienced, competent persons who have received professional training in rope work. Safety and risk prevention will be carefully studied and integrated into the written procedure for rope installation.

Procedure must take into account the characteristics and design requirements of the lift.

It must also be approved by the manufacturer of the lift or the client who will specify the initial setting conditions in writing (e.g. rope sag).

Elementary caution should be exercised in unwinding the rope, i.e. contacts and stress liable to cause irreversible damage. The following type of means should be used: support placed on the ground, deviation sheaves (diameter must be above 25 times the dia. of the rope), devices presenting the rope extremities from rotating and untwisting during the rope installation.

c) Tensioning and positioning the rope

Particular attention should be paid to respect rope tension settings and to the position of the tension appliances which must allow them to operate according to the constructor's specifications.

d) Splices, shortening and fastening of end attachments

These are the final operations to be performed on the ropes once installed, and include; final rope length adjustments, splices, shorter wings, socketing with molten metal or resin. These operations must be carried out by specialists. Depending on national codes currently in force, approval from an official body may be required with regard to the qualifications of these specialists and the working procedures.

Requirements concerning the geometry of the splices or the selection of approved products for socketing may vary according to the national codes or the technical criteria drawn up by the manufacturers.

The customer shall take steps to find out what requirements and obligations are to be respected and bring them to the attention of the specialist in writing at the time of ordering rope fixing work.

Technical Information

At the written request of the customer, ArcelorMittal will send a team:

- Either responsible for all the assembly work.
- Or only the wire rope work: splice, shortening, socketing. In this case, the company in charge of the rope installation work must carry out the supervision and take full responsibility of the following operations.

Prior to splicing:

- The adjustment of the appliance tensioning device according to the cableway manufacturer's or operator's requirements.
- The tensioning of the rope using the appropriate pulling devices (clamps jaws and winches) in compliance with safety and risk prevention procedures.
- The positioning of the two rope ends in the working area for splicing in accordance with cableway manufacturer's or operation's requirements to help the splicing specialist.
- The mobilisation of the necessary number of operators to help the splicing specialist.

After the splice has been made:

- The traceability form should be drawn up, mentioning the positioning of its tensioning carriage device: a) After the splice has been made and before rope operation. b) After 100 hours of rope running in.
- The positioning of the tensioning carriage on the guide should be indelibly marked. a) After the splice has been made and before rope operation. b) After 100 hours of rope running in.

The specialist in charge of the wire rope works (splice, shortening, socketing) will draw up a work report, mentioning the dimensions measured and compliance with contractual requirements.

Surveillance, inspection of ropes

The requirements regarding rope surveillance and discard criteria are detailed in the corresponding national and international standards and recommendations. However, we recommend that the frequency of rope inspection should constantly be adapted to real life working and environment conditions.

Cable maintenance

Lubricants

The products incorporated in the ropes when manufacturing are selected by the rope maker in compliance with operating requirements and the applicable standards to be specified in the order.

Not using adequate products could dangerously modify the friction ratio of the rope on the sheaves or damage the liners.

In any circumstances, the ropeway manufacturer's recommendations should always be followed when applying maintenance and cleaning products. You are advised not to use chemical solvents or products liable to cause corrosion on the cable itself or on the organs coming into contact with it.

We recommend consulting the ropeway manufacturer before using any rope maintenance lubricants, solvents, or any other chemical products. These should not be applied on the rope surface as they will wash the rope internal lubrication out. This might also, sooner or later, initiate some corrosion process.

Means of preventing localised damage

The cables are submitted to particular stress in such zones as:

- For carrying-hauling ropes: rope sections previously positioned inside fix grips (e.g. attachments for fixed seats).
- For track ropes: deviations on pylon shoes and tension devices, sockets.

By displacing the attachments on the ropes or the ropes on the ropeway, the risk of stress concentration on such areas can be significantly decreased. It is therefore essential to follow the manufacturer's ropeway recommendations and to respect the instructions given by applicable national regulations and standards, especially concerning the amplitude and frequency of such planned displacements.

Rope repairs

When the prescriptive criteria are reached, repair work can most of the time be carried out in order to be able to safely continue to operate once the rope is repaired. It is essential that these operations are carried out by skilled and trained specialists. Depending on national codes, approval from an official body may be required with their regard to the qualification of specialists and working procedures.

Repairing Lock Coil carrying ropes

The possibility of rupture of the external wires on this kind of rope must be carefully monitored. This should be accompanied by a more thorough inspection in the case it occurs on a particular zone such as deviation or an anchoring.

- 1 wire broken: check that the distance between the two extremities is not more than 25mm and that the two wire extremities are not raised out of their place as they have a tendency to do. Apply a sealing joint in the gap.
- 2 wires broken in the same rope lay length: repair is necessary. In case of such a repair, it is mandatory to observe the various corresponding requirements stated in applicable national regulations and applicable standards, in order to make sure that the results of the planned repair will totally comply with them.

Repairing stranded

In the case of localised or accidental damage, and provided that the prescriptive requirements are respected, a rope may be repaired by substituting one or two strands, adopting the same requirements and process as that used for making a splice. A standard rope can generally be repaired, taking into account the requirements stated in applicable national regulations and applicable standards by locally changing one or two strands.

Worldwide Market

From our manufacturing base in Bourg-en-Bresse, France, ArcelorMittal ROPES distributes its premium quality Ropeway Ropes around the world.

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