Teufelberger · Redaelli

UNDERGROUND MINING

High performance steel wire ropes

EN

Version 05.2024

Together in Motion

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⚠ WARNING

Using these products may prove hazardous. Therefore, never use our products for purposes other than those they were designed for. Customers must ensure that all persons using these products are familiar with their correct use and the related necessary safety precautions. Please bear in mind that any of these products may inflict harm when used incorrectly or subjected to excessive loads. As a manufacturer and supplier of wire ropes with many years of experience, our recommendations are nonbinding but based on experience.

TEUFELBERGER®, 拖飞宝®, REDAELLI®, PLASTFILL®, SUPERFILL®, PACK®, 7MINE®, IPERFLEX® and FLEXMINE® are internationally registered trademarks of the TEUFELBERGER Group. Subject to technical modifications, typesetting and printing errors.

TEUFELBERGER-REDAELLI:

Leading in High Performance Steel Wire Ropes with Added Value

The essence of Teufelberger-Redaelli

We at Teufelberger-Redaelli understand your day-to-day challenges and solve them together with you. We design, develop and manufacture high performance steel wire ropes that create added value by enhancing the efficiency and safety of your applications. Customers can expect more from our innovative steel wire ropes, our services, our experienced experts in development, our application engineering team, as well as our technical and commercial sales support – all around the globe. Being a family enterprise, we value and understand the great importance of successful, long-standing business relationships. Our commitment does not begin and end solely with the supply of premium quality steel wire ropes, but we also assist and support you throughout your work processes when it comes to optimizing efficiency and costs.

Application-specific (field-proven) expertise and product portfolio

At Teufelberger-Redaelli, we want to take the burden off your shoulders when making the right choices and choosing the most suitable rope for your application. Our specialists have a clear understanding of the most important criteria when considering the most suitable steel wire rope design for your application, and are therefore able to provide you with an optimal product recommendation. Every single application requires a specific, custom-tailored solution.

Rotation-resistant and non-rotation-resistant high performance steel wire ropes from Teufelberger-Redaelli are used for a variety of applications such as:

- heavy-duty lifting applications in construction, cargo handling in harbors and on ships, and in niche industries
- cranes in offshore and onshore oil exploration
- mining
- ropeways for the transport of passengers and goods
- forestry cranes and winches
- personal protective equipment against falls from a height

Four manufacturing sites for steel wire ropes and a combined total of more than 425 years of rope-making experience tally up to a unique wealth of expertise, and an unmatched and proven production standard. The combined result is a high degree of flexibility that allows us to keep delivery times to a minimum.

Service and support prior to and after steel wire rope selection

We know that high performance steel wire ropes are able to unleash their full potential only if hoisting systems have been set up optimally and the ropes have been installed correctly. Therefore, we also provide support during project planning, installation, and subsequent careful handling to maximize rope lifetimes. After all, the purchasing costs are just the tip of the iceberg.

GETTING THE BEST PERFORMANCE OUT OF YOUR HOISTING SYSTEM

Day in and day out, hoists/winders ensure that miners and their equipment are transported safely up and down the mine shaft, and that the ore mined is hoisted to the surface in a reliable, fast and efficient way. Whether they operate in ultra-deep or shallow shafts, or in perhaps aggressive salty, acidic or wet environments, these hoists are inseparably linked to the world of underground mining. Hoists/winders can only function efficiently and successfully if the installed ropes deliver the necessary and optimum performance.

Customers from around the globe have, for many years and in various climatic conditions, relied on quality products made by Teufelberger-Redaelli. Time and time again, we have improved and adapted the characteristics of our ropes in order to provide our customers with the best and most cost-effective solutions.

What matters most?

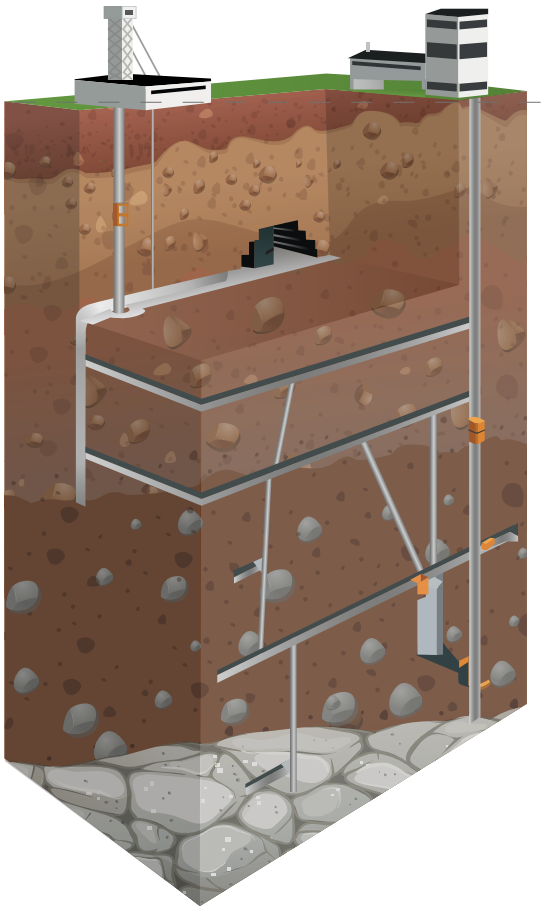
- ✔ Safety and reliability in use
- ✔ Reduced costs
- ✔ Higher efficiency
- ✔ High wear resistance
- ✔ High bending fatigue performance
- ✔ State of the art corrosion protection
- ✔ High resistance to shock loads
- ✔ Robustness against twisting and torque buildup
- ✔ Low elongation

Know your costs along the way

The initial purchasing costs for a wire rope are just the tip of the iceberg. Teufelberger-Redaelli will proactively work with you, providing technical support to reduce or eliminate the costs that become evident along the way.

Total Cost of Ownership

Visible costs



Invisible costs

- Initial purchasing costs for a wire rope
- Lost production time due to rope changes, unexpected rope failures and rope maintenance.
- Increased rope maintenance costs due to necessary drum end cuts at short intervals.
- Additional rope purchase costs due to short rope service life.
- Additional rope installation costs and lost production due to short rope service life.
- Increased maintenance costs of hoist components such as friction liners due to the wrong choice of rope.
- Increased MRT costs due to unpredictable rope deterioration process.

TECHNOLOGY - THE BASE FOR FLAWLESS PERFORMANCE

In manufacturing, research & development, as well as marketing & sales, Teufelberger-Redaelli focuses exclusively on high quality special purpose steel wire ropes. Breakthrough technologies and top quality products are our fundamental foundation for a long-lasting and successful relationship. The following short summary provides a glimpse into our deep knowledge and understanding of high performance wire ropes.

PLASTFILL® INSERT

The lubricated steel core is covered in a tight synthetic coat. This provides the following advantages:

- Long service life due to permanent lubrication within the rope and the reduced friction between the rope core and the outer strands
- Resistance to compression, crushing and lateral pressure as well as to external environmental influences and the entry of dirt.
- Higher breaking forces due to reduced contact stress occurring within the rope
- Reduced internal abrasion as a result of the exact positioning of strands providing a consistent, engineered clearance between each strand

SUPERFILL® COMPACTION TECHNOLOGY

Each rope strand is compacted in a proprietary process, which significantly improves the rope properties:

- Up to 30 % greater breaking forces than non-compacted ropes
- Prolonged service life due to lower specific load
- Less abrasion on the rope, reels and drums due to the rope's smooth outer surface
- Resistance against crushing in multilayer operations

GALVANIZED WIRES

Our steel wires are galvanized before they are drawn to achieve high wire dimensional precision. This ensures optimal stability and service life. In combination with the PLASTFILL® technology, this galvanization ensures exceptional corrosion resistance.

ACTIVE CORE LUBRICATION

Temperature resistant special grease with significantly improved lubrication properties:

- Higher resistance against corrosion of the core
- Improved service life due to optimal lubrication and the reduction of friction within the rope core and wires

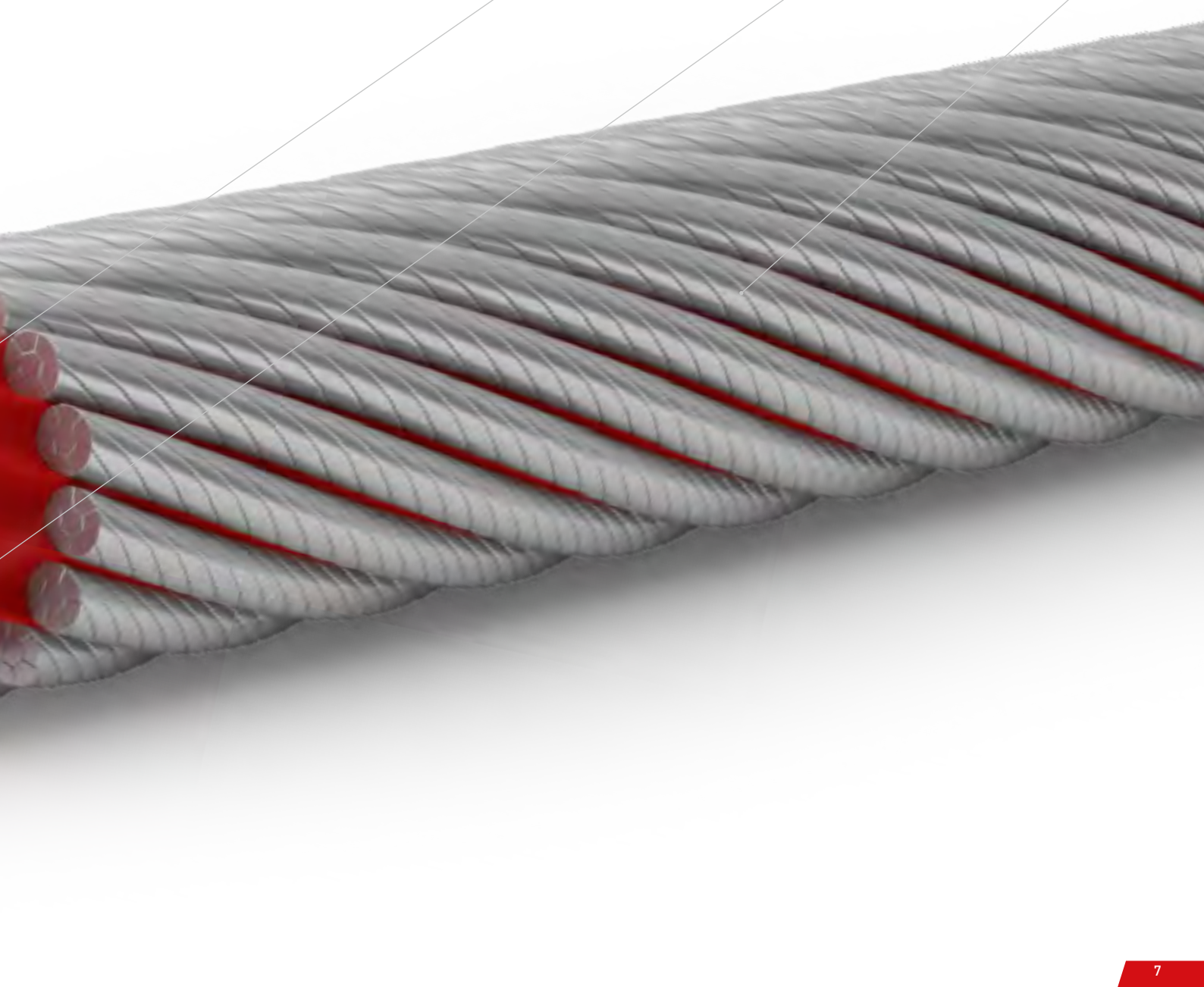
Our technology. Your benefit.

Long service life, flexibility, high quality, perfect spooling, rotation resistance, high breaking force, safe and reliable in use.

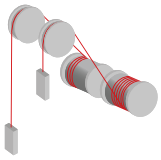
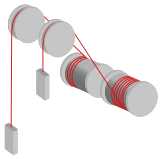
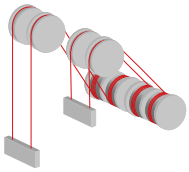
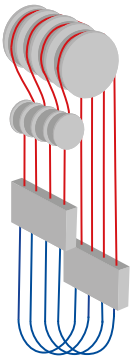
GALVANIZED WIRES

PLASTFILL®

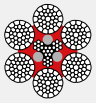
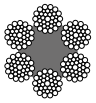
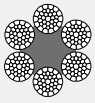
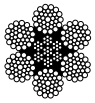
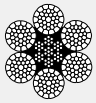
SUPERFILL®



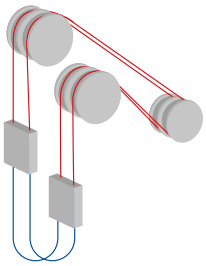
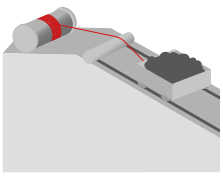
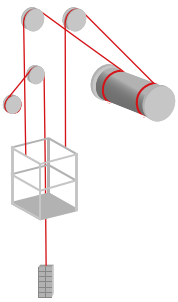
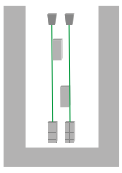
High Performance Wire Ropes at a Glance

System	Application	Rope								
					High performance hoist ropes					
		Non-rotation resistant ropes			Rotation resistant ropes					
		7MINE®	7MINE® HD	8MINE	12MINE 400(P)	12MINE 440(P)	12MINE 460(P)	FLEXMINE® 400(P)	FLEXMINE® 440(P)	FLEXMINE® 460(P)
Double drum hoist (single rope layer) 	Hoist rope	X	X	X	X	X	X	X	X	X
Double drum hoist (multi rope layer) 	Hoist rope	X	X	X		X	X		X	X
Blair hoist 	Hoist rope	X	X	X		X	X		X	X
Tower-mounted friction hoist 	Hoist rope	X	X	X	X	X	X	X	X	X
	Balance rope				*	*	*	*	*	*

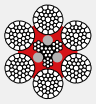
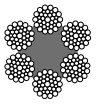
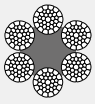
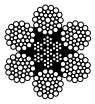
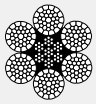
* Alternative to IPERFLEX (for further advice, please contact us at wirerope@teufelberger.com).

	High performance balance and guide ropes						Additional high performance hoist ropes				
	Rotation resistant ropes						Non-rotation resistant ropes				
®	FLEXPACK MINING(P)	EXTRAFLEX EVO	IPERFLEX®	IPERFLEX® H	IPERFLEX® L	FLEXGUIDE HLC	 6MINE	 RED 1T	 PACK® 1T	 RED 1	 PACK® 1
	X	X					X	X	X	X	X
	X	X					X with limitations		X with limitations		X with limitations
	X										
	X	X					X	X	X	X	X
	*		X	X	X						

High Performance Wire Ropes at a Glance

System	Application	Rope								
					High performance hoist ropes					
		Non-rotation resistant ropes			Rotation resistant ropes					
		7MINE®	7MINE® HD	8MINE	12MINE 400(P)	12MINE 440(P)	12MINE 460(P)	FLEXMINE® 400(P)	FLEXMINE® 440(P)	FLEXMINE 460(P)
Ground-mounted friction hoist 	Hoist rope	X	X	X	X	X	X	X	X	X
	Balance rope				*	*	*	*	*	*
Incline hoist 	Haulage rope	X	X							
Shaft sinking (special winch and hoist ropes with higher breaking forces upon request) 	Winch (stage) rope								X	X
	Hoist rope								X	X
Guide rope system 	Guide rope									

* Alternative to IPERFLEX (for further advice, please contact us at wirerope@teufelberger.com).

			High performance balance and guide ropes				Additional high performance hoist ropes				
			Rotation resistant ropes				Non-rotation resistant ropes				
®	FLEXPACK MINING(P)	EXTRAFLEX EVO	IPERFLEX®	IPERFLEX® H	IPERFLEX® L	FLEXGUIDE HLC	 6MINE	 RED 1T	 PACK® 1T	 RED 1	 PACK® 1
	X	X					X	X	X	X	X
	*		X	X	X						
	X										
	X										
						X FLC guide ropes upon request					

7MINE®

The proven 7-strand rope designed to replace conventional triangular strand ropes without changing existing hoisting performance parameters (custom fit). Compacted outer strands with Teufelberger-Redaelli SUPERFILL® compaction technology and our compound core ensure high resistance against drum crushing and the best-in-class weight to breaking strength ratio.

THE ULTIMATE ALTERNATIVE TO THE TRIANGULAR STRAND ROPE

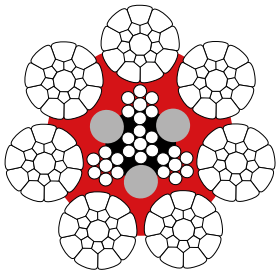
Specifications

- Lang lay or ordinary lay, right or left lay
- 22 – 48 mm: 7xK19S-EPIWRC (compound)
- 49 – 55 mm: 7xK26WS-EPIWRC (compound)
- 56 – 59 mm: 7xK31WS-EPIWRC (compound)
- Optional: 7xK19S (with built-up center)-EPIWRC (compound)
- Conformity: EN 12385-6 (other standards available upon request)
- Use without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✔ PLASTFILL®

Benefits

- Non-rotation resistant rope
  (builds up significantly less torque than triangular strand ropes)
- Good breaking force
- High resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Low rope elongation
- Good radial stability
- Good shock resistance
- Excellent rope for ultra-deep shaft mining



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
7xK19S-EPIWRC	22		1.69	2.15	1.44	397	89,249	447	100,490	495	111,280	324	72,838	365	82,055	405	91,048
	22.23	7/8	1.71	2.19	1.47	405	91,048	457	102,738	506	113,753	331	74,412	373	83,854	413	92,846
	23		1.77	2.35	1.58	434	97,567	489	109,932	541	121,622	354	79,582	399	89,699	442	99,366
	24		1.85	2.56	1.72	472	106,110	532	119,598	589	132,412	386	86,776	435	97,792	481	108,133
	25		1.93	2.77	1.86	512	115,102	577	129,715	639	143,653	418	93,970	472	106,110	522	117,350
	25.4	1	1.96	2.86	1.92	529	118,924	596	133,986	660	148,374	432	97,117	487	109,482	539	121,172
	26		2.00	3.00	2.02	554	124,544	625	140,506	692	155,568	453	101,838	510	114,653	565	127,017
	27		2.08	3.23	2.17	597	134,211	674	151,521	746	167,707	488	109,707	550	123,645	609	136,909
	28		2.16	3.48	2.34	643	144,552	724	162,762	802	180,297	525	118,025	592	133,087	655	147,250
	28.58	1 1/8	2.20	3.62	2.43	669	150,397	755	169,731	836	187,940	547	122,970	617	138,707	683	153,545
	29		2.23	3.73	2.51	689	154,893	777	174,677	860	193,336	563	126,567	635	142,754	703	158,041
	30		2.31	3.99	2.68	738	165,909	832	187,041	921	207,049	603	135,560	679	152,645	752	169,056
	31		2.39	4.26	2.86	788	177,149	888	199,630	983	220,987	643	144,552	725	162,986	803	180,522
	31.75	1 1/4	2.45	4.47	3.00	826	185,692	931	209,297	1,031	231,778	675	151,746	761	171,080	843	189,514
	32		2.47	4.54	3.05	839	188,615	946	212,669	1,048	235,600	686	154,219	773	173,777	856	192,436

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
7xK19S-EPIWRC	33		2.54	4.83	3.25	892	200,530	1,006	226,158	1,114	250,437	729	163,886	822	184,793	910	204,576
	34		2.62	5.13	3.45	947	212,894	1,068	240,096	1,183	265,949	774	174,002	873	196,258	966	217,165
	35	1⅜	2.70	5.43	3.65	1,004	225,708	1,132	254,484	1,253	281,686	820	184,343	925	207,948	1,024	230,204
	36		2.77	5.75	3.86	1,062	238,747	1,197	269,096	1,326	298,097	868	195,134	978	219,863	1,083	243,468
	37		2.85	6.07	4.08	1,122	252,236	1,265	284,383	1,401	314,957	917	206,150	1,033	232,228	1,144	257,181
	38	1½	2.93	6.41	4.31	1,183	265,949	1,334	299,895	1,477	332,043	967	217,390	1,090	245,042	1,207	271,344
	39		3.00	6.75	4.54	1,247	280,337	1,405	315,857	1,556	349,803	1,018	228,856	1,148	258,081	1,271	285,732
	40		3.08	7.10	4.77	1,311	294,725	1,478	332,268	1,637	368,012	1,071	240,770	1,208	271,569	1,337	300,570
	41		3.16	7.46	5.01	1,378	309,787	1,553	349,128	1,720	386,671	1,126	253,135	1,269	285,283	1,405	315,857
	41.28	1⅝	3.18	7.56	5.08	1,397	314,058	1,574	353,849	1,743	391,842	1,141	256,507	1,286	289,104	1,424	320,128
	42		3.24	7.82	5.25	1,446	325,074	1,630	366,439	1,805	405,780	1,181	265,499	1,332	299,446	1,474	331,368
	43		3.31	8.20	5.51	1,515	340,586	1,708	383,974	1,892	425,339	1,238	278,313	1,396	313,833	1,546	347,555
	44		3.39	8.59	5.77	1,587	356,772	1,789	402,183	1,981	445,347	1,296	291,352	1,461	328,446	1,618	363,741
	44.45	1¾	3.42	8.76	5.89	1,619	363,966	1,826	410,501	2,021	454,339	1,323	297,422	1,491	335,190	1,652	371,384
	45		3.47	8.98	6.03	1,660	373,183	1,871	420,618	2,072	465,804	1,356	304,841	1,529	343,733	1,693	380,602
	46		3.54	9.39	6.31	1,734	389,819	1,955	439,501	2,165	486,711	1,417	318,554	1,597	359,020	1,769	397,687
	47		3.62	9.80	6.59	1,810	406,904	2,041	458,835	2,260	508,068	1,479	332,492	1,667	374,757	1,846	414,997
	47.63	1⅞	3.67	10.06	6.76	1,859	417,920	2,096	471,200	2,321	521,782	1,519	341,485	1,712	384,873	1,896	426,238
	48		3.70	10.22	6.87	1,888	424,439	2,129	478,618	2,357	529,875	1,543	346,880	1,739	390,943	1,926	432,982
7xK26WS-EPIWRC	49		3.53	10.54	7.08	1,893	425,563	2,134	479,742	2,363	531,224	1,554	349,353	1,752	393,865	1,940	436,129
	50		3.60	10.97	7.37	1,971	443,098	2,222	499,525	2,460	553,030	1,618	363,741	1,825	410,276	2,020	454,114
	50.8	2	3.66	11.32	7.61	2,034	457,261	2,294	515,712	2,540	571,015	1,671	375,656	1,883	423,315	2,086	468,951
	51		3.68	11.41	7.67	2,050	460,858	2,312	519,758	2,560	575,511	1,684	378,578	1,898	426,687	2,102	472,548
	52		3.75	11.87	7.98	2,132	479,293	2,403	540,216	2,661	598,217	1,750	393,416	1,973	443,548	2,185	491,208
	53		3.82	12.33	8.29	2,214	497,727	2,496	561,123	2,764	621,372	1,818	408,703	2,050	460,858	2,270	510,316
	54	2⅛	3.89	12.80	8.60	2,299	516,836	2,592	582,705	2,870	645,202	1,888	424,439	2,128	478,393	2,357	529,875
	55		3.96	13.27	8.92	2,385	536,169	2,688	604,286	2,977	669,256	1,958	440,176	2,208	496,378	2,445	549,658
7xK31WS-EPI-WRC	56		3.48	13.83	9.29	2,516	565,619	2,836	637,558	3,141	706,125	2,030	456,362	2,289	514,588	2,534	569,666
	57		3.54	14.33	9.63	2,606	585,852	2,938	660,489	3,254	731,528	2,103	472,773	2,371	533,022	2,626	590,348
	57.15	2¼	3.55	14.40	9.68	2,620	588,999	2,954	664,086	3,271	735,350	2,114	475,246	2,384	535,945	2,640	593,496
	58		3.60	14.83	9.97	2,699	606,759	3,042	683,869	3,369	757,381	2,178	489,634	2,455	551,906	2,719	611,256
	59		3.66	15.35	10.31	2,792	627,667	3,148	707,699	3,486	783,684	2,253	506,495	2,541	571,240	2,813	632,388

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

7MINE® HD

The proven 7-strand design is extremely resistant to negative external influences. All strands are compacted using Teufelberger-Redaelli SUPERFILL® compaction technology. With its PLASTFILL® insert, the rope is extremely stable against lateral pressure.

WHEN BREAKING FORCE MATTERS MOST

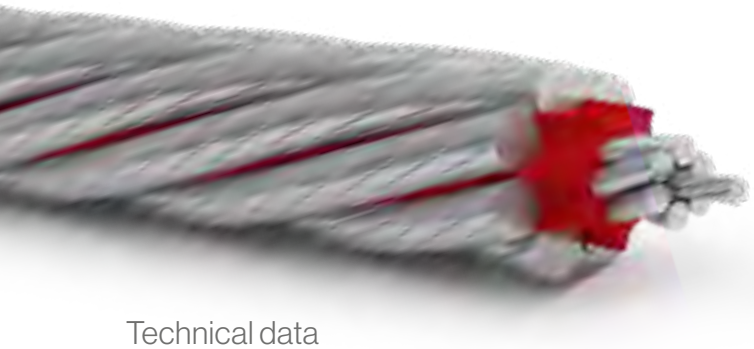
Specifications

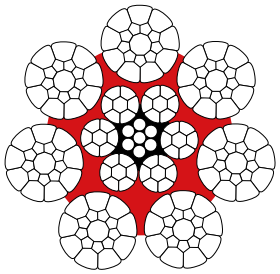
- Lang lay or ordinary lay, right or left lay
- 19 – 48 mm: 7xK19S-EPIWRC(K)
- 49 – 55 mm: 7xK26WS-EPIWRC(K)
- 56 – 65 mm: 7xK31WS-EPIWRC(K)
- Conformity: EN 12385-6 (other standards available upon request)
- Use without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✔ PLASTFILL®

Benefits

- Non-rotation resistant rope
- High breaking force
- High resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Very low rope elongation
- High radial stability
- Good shock resistance





Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
7xK19S-EPIWRC(K)	20		1.53	1.88	1.26	350	78,683	395	88,800	437	98,242	286	64,295	323	72,613	357	80,257
	21		1.60	2.07	1.39	386	86,776	436	98,017	482	108,358	315	70,815	356	80,032	394	88,575
	22		1.68	2.27	1.53	424	95,319	478	107,459	529	118,924	346	77,784	390	87,675	432	97,117
	22.23	7/8	1.70	2.32	1.56	433	97,342	488	109,707	540	121,397	353	79,358	398	89,474	441	99,141
	23		1.75	2.49	1.67	463	104,087	522	117,350	579	130,164	378	84,978	427	95,993	472	106,110
	24		1.83	2.71	1.82	505	113,529	569	127,916	630	141,630	412	92,621	464	104,311	514	115,552
	25		1.91	2.94	1.98	548	123,195	617	138,707	684	153,769	447	100,490	504	113,304	558	125,443
	25.4	1	1.94	3.03	2.04	565	127,017	637	143,203	706	158,715	461	103,637	520	116,901	576	129,490
	26		1.98	3.18	2.14	592	133,087	668	150,172	739	166,134	483	108,583	545	122,521	604	135,785
	27		2.06	3.42	2.30	639	143,653	720	161,862	797	179,173	521	117,125	588	132,188	651	146,351
	28		2.14	3.68	2.47	687	154,444	774	174,002	857	192,661	561	126,118	632	142,079	700	157,366
	28.58	1 1/8	2.18	3.84	2.58	716	160,963	807	181,421	893	200,754	584	131,288	659	148,149	729	163,886
	29		2.21	3.95	2.65	737	165,684	831	186,816	920	206,824	601	135,110	678	152,420	751	168,832
	30		2.29	4.23	2.84	788	177,149	889	199,855	984	221,212	644	144,777	726	163,211	804	180,746
	31		2.36	4.51	3.03	842	189,289	949	213,344	1,051	236,274	687	154,444	775	174,227	858	192,886

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
7xK19S-EPIWRC(K)	31.75	1 1/4	2.42	4.74	3.19	883	198,506	996	223,910	1,102	247,739	721	162,087	813	182,770	900	202,328
	32		2.44	4.81	3.23	897	201,654	1,011	227,282	1,120	251,786	732	164,560	826	185,692	914	205,475
	33		2.52	5.12	3.44	954	214,468	1,076	241,894	1,191	267,747	779	175,126	878	197,382	972	218,514
	34		2.59	5.43	3.65	1,013	227,731	1,142	256,732	1,264	284,159	827	185,917	932	209,522	1,032	232,003
	35	1 3/8	2.67	5.76	3.87	1,073	241,220	1,210	272,019	1,340	301,244	876	196,933	988	222,111	1,094	245,941
	36		2.75	6.09	4.09	1,135	255,158	1,280	287,755	1,417	318,554	927	208,398	1,045	234,925	1,157	260,104
	37		2.82	6.43	4.32	1,199	269,546	1,352	303,942	1,497	336,539	979	220,088	1,104	248,189	1,222	274,717
	38	1 1/2	2.90	6.78	4.56	1,265	284,383	1,426	320,578	1,579	354,973	1,033	232,228	1,164	261,678	1,289	289,779
	39		2.97	7.15	4.80	1,332	299,446	1,502	337,663	1,663	373,857	1,088	244,592	1,226	275,616	1,358	305,291
	40		3.05	7.52	5.05	1,402	315,182	1,580	355,198	1,750	393,416	1,144	257,181	1,290	290,004	1,429	321,252
	41		3.13	7.90	5.31	1,473	331,144	1,660	373,183	1,838	413,199	1,202	270,220	1,355	304,616	1,501	337,438
	41.28	1 5/8	3.15	8.01	5.38	1,493	335,640	1,683	378,353	1,864	419,044	1,219	274,042	1,374	308,887	1,521	341,934
	42		3.20	8.29	5.57	1,545	347,330	1,742	391,617	1,929	433,656	1,262	283,709	1,422	319,678	1,575	354,074
	43		3.28	8.69	5.84	1,620	364,190	1,826	410,501	2,022	454,564	1,322	297,197	1,491	335,190	1,651	371,160
	44		3.36	9.10	6.11	1,696	381,276	1,912	429,835	2,117	475,921	1,385	311,360	1,561	350,927	1,729	388,695
	44.45	1 3/4	3.39	9.28	6.24	1,731	389,144	1,951	438,602	2,161	485,812	1,413	317,655	1,593	358,121	1,764	396,563
	45		3.43	9.51	6.39	1,774	398,811	2,000	449,618	2,215	497,952	1,448	325,523	1,633	367,113	1,808	406,455
	46		3.51	9.94	6.68	1,854	416,796	2,090	469,851	2,314	520,208	1,513	340,136	1,706	383,524	1,889	424,664
	47		3.58	10.38	6.98	1,935	435,005	2,182	490,533	2,416	543,138	1,580	355,198	1,781	400,385	1,972	443,323
	47.63	1 7/8	3.63	10.66	7.16	1,987	446,695	2,241	503,797	2,481	557,751	1,622	364,640	1,829	411,176	2,026	455,463
	48		3.66	10.82	7.27	2,018	453,664	2,275	511,440	2,520	566,519	1,648	370,485	1,858	417,695	2,057	462,432
7xK26WS-EPIWRC(K)	49		3.50	11.16	7.50	2,029	456,137	2,288	514,363	2,534	569,666	1,673	376,105	1,886	423,990	2,088	469,401
	50		3.57	11.62	7.81	2,113	475,021	2,382	535,495	2,638	593,046	1,742	391,617	1,964	441,525	2,174	488,735
	50.8	2	3.62	12.00	8.06	2,181	490,308	2,459	552,805	2,723	612,155	1,798	404,206	2,027	455,688	2,245	504,696
	51		3.64	12.09	8.12	2,199	494,355	2,479	557,301	2,745	617,101	1,812	407,354	2,043	459,285	2,262	508,518
	52		3.71	12.57	8.45	2,286	513,913	2,577	579,333	2,853	641,380	1,884	423,540	2,124	477,494	2,352	528,751
	53		3.78	13.06	8.78	2,374	533,696	2,677	601,814	2,964	666,334	1,957	439,951	2,206	495,929	2,443	549,208
	54	2 1/8	3.85	13.55	9.11	2,465	554,154	2,779	624,744	3,077	691,737	2,032	456,812	2,290	514,812	2,536	570,115
	55		3.92	14.06	9.45	2,557	574,836	2,883	648,124	3,192	717,590	2,107	473,672	2,376	534,146	2,631	591,472
7xK31WS-EPIWRC(K)	56		3.44	14.64	9.84	2,693	605,410	3,036	682,520	3,362	755,808	2,185	491,208	2,463	553,704	2,728	613,279
	57		3.50	15.17	10.19	2,790	627,217	3,146	707,249	3,483	783,010	2,264	508,967	2,552	573,712	2,826	635,310
	57.15	2 1/4	3.51	15.25	10.25	2,805	630,589	3,162	710,846	3,502	787,281	2,275	511,440	2,565	576,635	2,841	638,682
	58		3.57	15.71	10.56	2,889	649,473	3,257	732,203	3,607	810,886	2,344	526,952	2,642	593,945	2,926	657,791
	59		3.63	16.26	10.93	2,990	672,179	3,370	757,606	3,732	838,987	2,425	545,162	2,734	614,628	3,028	680,721
	60		3.69	16.81	11.30	3,092	695,109	3,486	783,684	3,860	867,763	2,508	563,821	2,828	635,760	3,131	703,877
	60.33	2 3/8	3.71	17.00	11.42	3,126	702,753	3,524	792,227	3,902	877,204	2,536	570,115	2,859	642,729	3,166	711,745
	61		3.75	17.38	11.68	3,196	718,489	3,603	809,987	3,989	896,763	2,592	582,705	2,923	657,117	3,236	727,482
	62		3.81	17.95	12.06	3,301	742,094	3,722	836,739	4,121	926,438	2,678	602,038	3,019	678,698	3,343	751,536
	63		3.87	18.53	12.45	3,409	766,374	3,843	863,941	4,255	956,562	2,765	621,597	3,117	700,729	3,452	776,040
	63.5	2 1/2	3.90	18.83	12.65	3,463	778,513	3,904	877,654	4,323	971,849	2,809	631,488	3,167	711,970	3,507	788,405
	64		3.93	19.13	12.85	3,518	790,878	3,966	891,592	4,391	987,136	2,854	641,605	3,217	723,210	3,562	800,769
	65		4.00	19.73	13.26	3,628	815,607	4,091	919,693	4,530	1,018,385	2,944	661,838	3,318	745,916	3,675	826,173

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

8MINE

An 8-strand rope designed to replace conventional triangular strand ropes without changing existing hoisting performance parameters (custom fit). Compacted outer strands with Teufelberger-Redaelli SUPERFILL® compaction technology and our unique core ensure good resistance against drum crushing and the best-in-class weight to breaking strength ratio.

ENDURANCE IS EVERYTHING

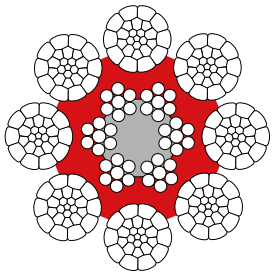
Specifications

- Lang lay or ordinary lay, right or left lay
- 20 – 30 mm: 8xK19S-EPIWRC
- 31 – 48 mm: 8xK26WS-EPIWRC
- 49 – 59 mm: 8xK31WS-EPIWRC
- 60 – 65 mm: 8xK36WS-EPIWRC
- Conformity: EN 12385-6 (other standards available upon request)
- Use without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✔ PLASTFILL®

Benefits

- Non-rotation resistant rope
  (builds up significantly less torque than triangular strand ropes)
- Good breaking force
- Good resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Low rope elongation
- Good radial stability
- Good shock resistance



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
8xK19S-EPIWRC	20		1.36	1.68	1.13	300	67,524	339	76,155	375	84,354	252	56,550	284	63,754	314	70,598
	21		1.43	1.85	1.24	331	74,469	374	83,984	414	93,023	277	62,346	313	70,289	346	77,834
	22		1.50	2.03	1.36	364	81,752	410	92,195	454	102,115	304	68,426	343	77,142	380	85,423
	22.23	7/8	1.51	2.07	1.39	371	83,437	419	94,095	464	104,219	311	69,832	350	78,728	388	87,179
	23		1.57	2.22	1.49	398	89,374	448	100,787	497	111,630	333	74,787	375	84,315	415	93,365
	24		1.63	2.42	1.62	433	97,334	488	109,762	541	121,568	362	81,432	408	91,806	452	101,660
	25		1.70	2.62	1.76	470	105,633	530	119,118	587	131,929	393	88,360	443	99,616	491	110,309
	25.4	1	1.73	2.71	1.82	485	109,048	547	122,968	606	136,192	406	91,210	457	102,829	507	113,867
	26		1.77	2.84	1.91	508	114,271	573	128,857	635	142,713	425	95,570	479	107,744	531	119,310
	27		1.84	3.06	2.05	548	123,248	618	138,977	685	153,920	458	103,063	517	116,192	572	128,664
	28		1.91	3.29	2.21	590	132,564	665	149,479	736	165,549	493	110,838	556	124,958	616	138,371
	28.58	1 1/8	1.95	3.42	2.30	614	138,073	693	155,691	767	172,428	513	115,437	579	130,143	641	144,113
	29		1.97	3.53	2.37	633	142,218	713	160,364	790	177,602	529	118,897	596	134,043	660	148,431
	30		2.04	3.78	2.54	677	152,211	763	171,630	846	190,077	566	127,238	638	143,446	707	158,845

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
8xK26WS-EPIWRC	31		1.97	4.08	2.74	733	164,732	826	185,746	915	205,709	610	137,194	688	154,670	762	171,273
	31.75	1 ¼	2.02	4.28	2.88	769	172,811	867	194,854	960	215,794	640	143,912	722	162,245	799	179,661
	32		2.04	4.35	2.92	781	175,547	880	197,938	975	219,209	650	146,188	733	164,810	812	182,502
	33		2.10	4.63	3.11	831	186,704	936	210,516	1037	233,138	692	155,467	780	175,272	863	194,086
	34		2.16	4.91	3.30	882	198,205	994	223,482	1101	247,496	734	165,032	828	186,055	916	206,027
	35	1 ⅜	2.23	5.21	3.50	934	210,049	1053	236,835	1167	262,282	778	174,883	877	197,161	971	218,325
	36		2.29	5.51	3.70	989	222,236	1115	250,575	1234	277,497	823	185,019	928	208,588	1027	230,979
	37		2.35	5.82	3.91	1044	234,766	1177	264,702	1304	293,140	869	195,440	980	220,337	1085	243,989
	38	1 ½	2.42	6.14	4.12	1102	247,640	1242	279,215	1375	309,212	917	206,147	1034	232,408	1145	257,356
	39		2.48	6.47	4.34	1160	260,857	1308	294,116	1449	325,712	966	217,140	1089	244,801	1206	271,079
	40		2.54	6.80	4.57	1221	274,418	1376	309,404	1524	342,641	1016	228,418	1145	257,516	1268	285,159
	41		2.61	7.15	4.80	1283	288,322	1446	325,079	1601	359,999	1067	239,982	1203	270,553	1333	299,595
	41.28	1 ⅝	2.63	7.24	4.87	1300	292,205	1466	329,458	1623	364,847	1082	243,212	1220	274,194	1351	303,627
	42		2.67	7.50	5.04	1346	302,569	1517	341,141	1680	377,785	1120	251,831	1263	283,911	1398	314,388
	43		2.74	7.86	5.28	1411	317,159	1591	357,590	1761	396,000	1174	263,966	1324	297,592	1466	329,537
	44		2.80	8.23	5.53	1477	332,093	1666	374,426	1844	414,643	1229	276,386	1386	311,594	1535	345,042
	44.45	1 ¾	2.83	8.40	5.64	1508	338,925	1700	382,129	1882	423,172	1255	282,068	1415	318,000	1566	352,136
	45		2.86	8.61	5.78	1545	347,370	1742	391,649	1929	433,715	1286	289,092	1450	325,918	1605	360,904
	46		2.93	8.99	6.04	1615	362,990	1820	409,260	2016	453,216	1344	302,083	1515	340,565	1678	377,122
	47		2.99	9.39	6.31	1686	378,954	1901	427,257	2105	473,145	1403	315,360	1581	355,533	1751	393,697
	47.63	1 ⅞	3.03	9.64	6.48	1731	389,105	1951	438,702	2161	485,818	1440	323,803	1624	365,051	1798	404,238
	48		3.05	9.79	6.58	1758	395,261	1982	445,641	2195	493,502	1463	328,922	1650	370,823	1827	410,629
8xK31WS-EPIWRC	49		2.70	10.33	6.94	1855	416,996	2091	470,145	2316	520,637	1540	346,098	1736	390,186	1922	432,071
	50		2.76	10.76	7.23	1931	434,199	2178	489,540	2411	542,113	1603	360,368	1807	406,275	2001	449,886
	50.8	2	2.80	11.10	7.46	1994	448,212	2248	505,338	2489	559,607	1655	371,992	1865	419,380	2066	464,398
	51		2.81	11.19	7.52	2009	451,750	2266	509,326	2509	564,024	1668	374,927	1880	422,688	2082	468,062
	52		2.87	11.64	7.82	2089	469,648	2355	529,504	2608	586,368	1734	389,774	1955	439,427	2164	486,597
	53		2.92	12.09	8.12	2170	487,894	2447	550,075	2710	609,146	1801	404,910	2031	456,491	2249	505,492
	54	2 ⅛	2.98	12.55	8.43	2253	506,487	2540	571,036	2813	632,358	1870	420,333	2108	473,879	2334	524,748
	55		3.04	13.02	8.75	2337	525,428	2635	592,390	2918	656,004	1940	436,046	2187	491,593	2421	544,363
	56		3.09	13.49	9.07	2423	544,716	2732	614,136	3025	680,084	2011	452,046	2267	509,631	2510	564,338
	57		3.15	13.98	9.39	2510	564,352	2830	636,273	3134	704,598	2083	468,335	2349	527,995	2601	584,672
	57.15	2 ¼	3.15	14.05	9.44	2524	567,328	2845	639,628	3151	708,312	2094	470,803	2361	530,778	2614	587,754
	58		3.20	14.48	9.73	2599	584,336	2930	658,802	3245	729,545	2157	484,911	2432	546,684	2693	605,367
	59		3.26	14.98	10.07	2690	604,667	3032	681,723	3358	754,927	2232	501,777	2516	565,697	2786	626,422
8xK36WS-EPIWRC	60		2.92	15.62	10.50	2805	630,565	3162	710,920	3502	787,258	2331	523,920	2627	590,661	2909	654,066
	60.33	2 ⅜	2.94	15.79	10.61	2835	637,417	3197	718,645	3540	795,812	2356	529,611	2656	597,077	2941	661,171
	61		2.97	16.15	10.85	2899	651,766	3269	734,823	3620	813,726	2409	541,529	2716	610,514	3007	676,050
	62		3.02	16.68	11.21	2995	673,318	3377	759,120	3739	840,632	2488	559,430	2805	630,695	3107	698,397
	63		3.07	17.22	11.57	3092	695,221	3487	783,813	3861	867,975	2569	577,622	2897	651,204	3208	721,107
	63.5	2 ½	3.09	17.50	11.76	3142	706,303	3542	796,307	3922	881,810	2610	586,827	2943	661,582	3259	732,599
	64		3.12	17.77	11.94	3191	717,474	3598	808,900	3985	895,755	2652	596,104	2989	672,041	3310	744,181
	65		3.17	18.33	12.32	3292	740,077	3712	834,383	4110	923,973	2735	614,878	3084	693,207	3415	767,619

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

12MINE 400(P)

12-strand rotation resistant rope with optional PLASTFILL® insert between the steel core and the outer strands. A high performance hoist rope for Koepe friction winders and single layer drum winders when rope elongation, rope twist and bending fatigue matter.

ROTATION RESISTANCE WITH LESS WEIGHT

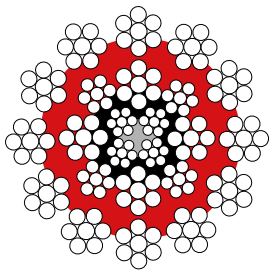
Specifications

- Lang lay or ordinary lay, right and left lay
- 19 – 65 mm: 12x7-EPIWRC (or IWRC)
- Conformity: EN 12385-6 (other standards available upon request)
- Use with or without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✘ SUPERFILL®
✔ PLASTFILL®

Benefits

- Rotation resistant
- Good breaking force
- Good flexibility and bending fatigue performance
- Low rope elongation
- High radial stability
- Improved shock resistance with PLASTFILL®



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
12x7-IWRC or 12x7-EPIWRC	19		1.20	1.44	0.97	259	58,317	293	65,775	324	72,859	209	47,034	236	53,025	261	58,717
	19.05	¾	1.21	1.45	0.97	261	58,626	294	66,122	326	73,244	210	47,281	237	53,305	263	59,027
	20		1.27	1.60	1.07	288	64,641	324	72,905	359	80,755	232	52,115	261	58,754	289	65,060
	21		1.33	1.76	1.18	317	71,290	358	80,400	396	89,055	256	57,457	288	64,776	319	71,729
	22		1.39	1.93	1.30	348	78,263	393	88,262	435	97,760	280	63,059	316	71,092	350	78,723
	22.23	⅞	1.41	1.97	1.32	355	79,877	401	90,081	444	99,775	286	64,355	323	72,553	357	80,342
	23		1.46	2.11	1.42	381	85,561	429	96,489	475	106,871	307	68,922	346	77,702	383	86,043
	24		1.52	2.30	1.54	414	93,183	467	105,082	518	116,386	334	75,045	376	84,605	417	93,687
	25		1.59	2.49	1.68	450	101,129	507	114,040	562	126,306	362	81,429	408	91,803	452	101,657
	25.4	1	1.61	2.57	1.73	464	104,398	524	117,726	580	130,387	374	84,056	422	94,764	467	104,936
	26		1.65	2.70	1.81	487	109,399	549	123,364	608	136,631	392	88,074	442	99,294	489	109,952
	27		1.71	2.91	1.95	525	117,994	592	133,054	655	147,360	422	94,979	476	107,078	527	118,573
	28		1.78	3.13	2.10	565	126,913	637	143,109	705	158,495	454	102,145	512	115,157	567	127,519
	28.58	1 ⅛	1.81	3.26	2.19	588	132,188	663	149,056	734	165,081	473	106,383	533	119,935	591	132,810
	29		1.84	3.36	2.26	606	136,157	683	153,530	756	170,035	487	109,571	549	123,529	608	136,790

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
12x7-IWRC or 12x7-EPIWRC	30		1.90,	3.59	2.41	648	145,724	731	164,317	809	181,979	522	117,258	588	132,196	651	146,386
	31		1.97	3.83	2.58	692	155,616	781	175,469	864	194,329	557	125,206	628	141,156	695	156,308
	31.75	1 ¼	2.01	4.02	2.70	726	163,248	819	184,073	907	203,856	584	131,337	659	148,068	729	163,963
	32		2.03	4.09	2.75	738	165,833	832	186,987	921	207,083	593	133,414	669	150,409	741	166,555
	33		2.09	4.35	2.92	785	176,374	885	198,870	980	220,242	631	141,883	712	159,957	788	177,127
	34		2.16	4.61	3.10	833	187,239	939	211,119	1040	233,806	670	150,612	755	169,798	836	188,025
	35	1 ⅜	2.22	4.89	3.28	883	198,428	995	223,734	1102	247,775	710	159,602	800	179,933	886	199,248
	36		2.28	5.17	3.48	934	209,942	1053	236,715	1166	262,149	751	168,852	847	190,362	938	210,796
	37		2.35	5.46	3.67	987	221,780	1112	250,061	1232	276,928	793	178,363	894	201,084	990	222,670
	38	1 ½	2.41	5.76	3.87	1041	233,942	1173	263,773	1299	292,111	837	188,134	943	212,101	1045	234,868
	39		2.47	6.07	4.08	1096	246,429	1236	277,850	1369	307,700	881	198,166	994	223,411	1100	247,393
	40		2.54	6.38	4.29	1153	259,240	1300	292,293	1440	323,693	927	208,459	1045	235,014	1158	260,242
	41		2.6	6.71	4.51	1212	272,376	1366	307,102	1513	340,092	974	219,012	1098	246,912	1216	273,417
	41.28	1 ⅝	2.62	6.80	4.57	1228	276,045	1384	311,238	1533	344,672	987	221,960	1113	250,235	1233	277,097
	42		2.66	7.04	4.73	1271	285,835	1434	322,276	1588	356,895	1022	229,826	1153	259,103	1276	286,917
	43		2.73	7.38	4.96	1333	299,620	1503	337,816	1664	374,103	1072	240,901	1208	271,589	1338	300,742
	44		2.79	7.73	5.19	1396	313,728	1573	353,722	1742	391,716	1122	252,236	1265	284,367	1401	314,893
	44.45	1 ¾	2.82	7.88	5.30	1424	320,183	1606	360,999	1778	399,774	1145	257,421	1291	290,214	1430	321,367
	45		2.85	8.08	5.43	1460	328,161	1646	369,993	1823	409,734	1174	263,831	1323	297,440	1465	329,369
	46		2.92	8.44	5.67	1525	342,918	1720	386,630	1905	428,157	1226	275,687	1383	310,807	1531	344,170
	47		2.98	8.81	5.92	1592	357,999	1795	403,633	1988	446,985	1280	287,804	1443	324,467	1598	359,297
	47.63	1 ⅞	3.02	9.05	6.08	1635	367,590	1844	414,445	2042	458,958	1314	295,509	1482	333,154	1641	368,916
	48		3.04	9.19	6.18	1661	373,405	1873	421,001	2074	466,217	1335	300,181	1505	338,421	1667	374,748
	49		3.11	9.58	6.44	1731	389,135	1952	438,735	2161	485,855	1391	312,819	1569	352,669	1737	390,526
	50		3.17	9.98	6.70	1802	405,189	2032	456,835	2250	505,897	1449	325,717	1633	367,210	1809	406,628
	50.8	2	3.22	10.30	6.92	1861	418,266	2098	471,577	2323	522,223	1496	336,224	1686	379,055	1867	419,744
	51		3.23	10.38	6.97	1875	421,568	2114	475,300	2341	526,345	1507	338,876	1699	382,045	1882	423,056
	52		3.3	10.79	7.25	1950	438,271	2198	494,131	2434	547,197	1567	352,296	1767	397,174	1956	439,809
	53		3.36	11.21	7.53	2025	455,299	2283	513,327	2529	568,454	1628	365,976	1835	412,597	2032	456,887
	54	2 ⅛	3.42	11.64	7.82	2102	472,650	2370	532,889	2625	590,116	1690	379,917	1905	428,314	2110	474,291
	55		3.49	12.07	8.11	2181	490,326	2459	552,817	2723	612,183	1753	394,118	1976	444,324	2189	492,020
	56		3.55	12.51	8.41	2261	508,327	2549	573,110	2823	634,655	1817	408,580	2049	460,628	2269	510,074
	57		3.61	12.96	8.71	2343	526,652	2641	593,770	2925	657,532	1883	423,302	2123	477,226	2351	528,454
	57.15	2 ¼	3.62	13.03	8.76	2355	529,428	2655	596,900	2940	660,998	1893	425,533	2134	479,741	2363	531,239
	58		3.68	13.42	9.02	2426	545,301	2735	614,794	3028	680,813	1950	438,285	2198	494,118	2434	547,159
	59		3.74	13.89	9.33	2510	564,274	2830	636,185	3134	704,500	2017	453,529	2274	511,303	2519	566,189
	60		3.8	14.37	9.65	2596	583,572	2927	657,941	3241	728,591	2086	469,033	2352	528,783	2605	585,544
	60.33	2 ⅜	3.82	14.52	9.76	2624	589,913	2958	665,090	3276	736,508	2109	474,128	2378	534,527	2633	591,905
	61		3.87	14.85	9.98	2683	603,194	3025	680,062	3350	753,088	2156	484,798	2431	546,555	2692	605,225
	62		3.93	15.34	10.31	2772	623,140	3125	702,550	3461	777,989	2228	500,823	2512	564,622	2781	625,231
	63		3.99	15.84	10.64	2862	643,411	3227	725,403	3573	803,295	2300	517,109	2593	582,983	2872	645,563
	63.5	2 ½	4.03	16.09	10.81	2908	653,668	3278	736,966	3630	816,100	2337	525,350	2635	592,273	2917	655,850
	64		4.06	16.34	10.98	2954	664,006	3330	748,621	3688	829,006	2374	533,655	2676	601,637	2963	666,220
	65		4.12	16.86	11.33	3047	684,925	3435	772,206	3804	855,122	2449	550,462	2760	620,585	3057	687,202

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

12MINE 440(P)

12-strand rotation resistant rope with optional PLASTFILL® insert between the steel core and the outer strands. Compacted outer strands with Teufelberger-Redaelli SUPERFILL® compaction technology make the rope wear resistant and ideal for multi-layer drum winders but also suitable for single layer drum and Koepe friction winders.

WEAR AND ROTATION RESISTANCE WITH LESS WEIGHT

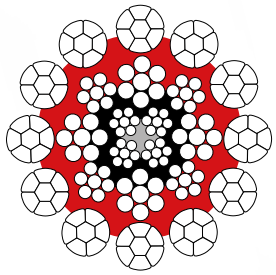
Specifications

- Lang lay or ordinary lay, right and left lay
- 19 – 65 mm: 12xK7-EPIWRC (or IWRC)
- Conformity: EN 12385-6 (other standards available upon request)
- Use with or without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✔ PLASTFILL®

Benefits

- Rotation resistant
- Good breaking force
- High resistance to wear and drum crushing
- Good flexibility and bending fatigue performance
- Low rope elongation
- High radial stability
- Improved shock resistance with PLASTFILL®



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
12xK7-IWRC or 12xK7-EPIWRC	19	3/4	1.33	1.63	1.10	294	66,094	331	74,412	367	82,505	236	53,055	266	59,799	295	66,319
	20		1.40	1.81	1.22	325	73,063	367	82,505	406	91,272	261	58,675	295	66,319	326	73,288
	21		1.47	1.99	1.34	359	80,706	405	91,048	448	100,714	288	64,745	325	73,063	360	80,931
	22		1.54	2.19	1.47	394	88,575	444	99,815	492	110,606	316	71,040	357	80,257	395	88,800
	22.23	7/8	1.55	2.24	1.51	402	90,373	453	101,838	502	112,854	323	72,613	364	81,830	403	90,598
	23		1.61	2.39	1.61	430	96,668	485	109,032	537	120,722	346	77,784	390	87,675	432	97,117
	24		1.68	2.61	1.75	469	105,435	528	118,699	585	131,513	376	84,528	424	95,319	470	105,660
	25		1.75	2.83	1.90	509	114,428	573	128,816	635	142,754	408	91,722	460	103,412	510	114,653
	25.4	1	1.77	2.92	1.96	525	118,025	592	133,087	655	147,250	422	94,869	475	106,784	526	118,250
	26		1.82	3.06	2.06	550	123,645	620	139,382	687	154,444	442	99,366	498	111,955	552	124,095
	27		1.89	3.30	2.22	593	133,312	669	150,397	741	166,583	476	107,009	537	120,722	595	133,761
	28		1.96	3.55	2.39	638	143,428	719	161,638	796	178,948	512	115,102	578	129,940	640	143,878
	28.58	1 1/8	2.00	3.69	2.48	665	149,498	749	168,382	830	186,591	534	120,048	602	135,335	666	149,723
	29		2.03	3.80	2.55	684	153,769	771	173,328	854	191,987	550	123,645	620	139,382	686	154,219
	30		2.10	4.07	2.73	732	164,560	826	185,692	914	205,475	588	132,188	663	149,048	734	165,010

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
12xK7-IWRC or 12xK7-EPIWRC	31		2.17	4.35	2.92	782	175,801	882	198,281	976	219,414	628	141,180	708	159,165	784	176,250
	31.75	1 1/4	2.22	4.56	3.06	820	184,343	925	207,948	1,024	230,204	659	148,149	743	167,033	822	184,793
	32		2.24	4.63	3.11	833	187,266	939	211,096	1,040	233,801	669	150,397	754	169,506	835	187,715
	33		2.31	4.93	3.31	886	199,181	999	224,584	1,106	248,639	712	160,064	802	180,297	888	199,630
	34		2.38	5.23	3.51	941	211,545	1,060	238,297	1,174	263,926	755	169,731	852	191,537	943	211,995
	35	1 3/8	2.45	5.54	3.72	997	224,135	1,124	252,685	1,244	279,662	801	180,072	903	203,002	999	224,584
	36		2.52	5.86	3.94	1,055	237,173	1,189	267,298	1,317	296,073	847	190,413	955	214,693	1,057	237,623
	37		2.59	6.19	4.16	1,114	250,437	1,256	282,360	1,391	312,709	895	201,204	1,009	226,832	1,117	251,112
	38	1 1/2	2.66	6.53	4.39	1,175	264,151	1,325	297,872	1,467	329,795	944	212,220	1,064	239,197	1,178	264,825
	39		2.73	6.88	4.62	1,238	278,313	1,395	313,608	1,545	347,330	994	223,460	1,121	252,011	1,241	278,988
	40		2.79	7.24	4.87	1,302	292,701	1,468	330,020	1,625	365,315	1,046	235,150	1,179	265,050	1,305	293,376
	41		2.86	7.60	5.11	1,368	307,539	1,542	346,655	1,708	383,974	1,099	247,065	1,239	278,538	1,371	308,213
	41.28	1 5/8	2.88	7.71	5.18	1,387	311,810	1,563	351,376	1,731	389,144	1,114	250,437	1,256	282,360	1,390	312,484
	42		2.93	7.98	5.36	1,435	322,601	1,618	363,741	1,792	402,858	1,153	259,205	1,300	292,252	1,439	323,500
	43		3.00	8.36	5.62	1,505	338,337	1,696	381,276	1,878	422,191	1,208	271,569	1,362	306,190	1,509	339,237
	44		3.07	8.76	5.89	1,575	354,074	1,776	399,261	1,967	442,199	1,265	284,383	1,426	320,578	1,580	355,198
	44.45	1 3/4	3.11	8.94	6.01	1,608	361,493	1,813	407,579	2,007	451,192	1,291	290,228	1,456	327,322	1,612	362,392
	45		3.14	9.16	6.16	1,648	370,485	1,858	417,695	2,057	462,432	1,323	297,422	1,492	335,415	1,652	371,384
	46		3.21	9.57	6.43	1,722	387,121	1,941	436,354	2,149	483,114	1,383	310,911	1,559	350,477	1,726	388,020
	47		3.28	9.99	6.71	1,797	403,982	2,026	455,463	2,244	504,471	1,444	324,624	1,628	365,989	1,802	405,106
	47.63	1 7/8	3.33	10.26	6.89	1,846	414,997	2,081	467,827	2,305	518,185	1,483	333,392	1,671	375,656	1,851	416,121
	48		3.35	10.42	7.00	1,875	421,517	2,114	475,246	2,340	526,053	1,506	338,562	1,698	381,726	1,880	422,641
	49		3.42	10.86	7.30	1,954	439,277	2,203	495,254	2,439	548,309	1,569	352,725	1,769	397,687	1,959	440,401
	50		3.49	11.31	7.60	2,034	457,261	2,293	515,487	2,540	571,015	1,634	367,338	1,842	414,098	2,040	458,610
	50.8	2	3.55	11.67	7.84	2,100	472,099	2,367	532,123	2,621	589,224	1,687	379,253	1,901	427,362	2,105	473,223
	51		3.56	11.76	7.90	2,116	475,696	2,386	536,394	2,642	593,945	1,700	382,175	1,916	430,734	2,122	477,045
	52		3.63	12.23	8.22	2,200	494,580	2,481	557,751	2,747	617,550	1,767	397,237	1,992	447,819	2,206	495,929
	53		3.70	12.70	8.53	2,286	513,913	2,577	579,333	2,853	641,380	1,836	412,749	2,070	465,355	2,292	515,262
	54	2 1/8	3.77	13.19	8.86	2,373	533,472	2,675	601,364	2,962	665,884	1,906	428,486	2,148	482,890	2,379	534,820
	55		3.84	13.68	9.19	2,461	553,255	2,775	623,845	3,073	690,838	1,977	444,447	2,229	501,099	2,468	554,828
	56		3.91	14.18	9.53	2,552	573,712	2,877	646,775	3,186	716,241	2,049	460,634	2,311	519,533	2,559	575,286
	57		3.98	14.70	9.88	2,644	594,395	2,980	669,931	3,300	741,870	2,123	477,269	2,394	538,193	2,651	595,969
	57.15	2 1/4	3.99	14.77	9.92	2,658	597,542	2,996	673,528	3,318	745,916	2,135	479,967	2,406	540,890	2,665	599,116
	58		4.05	15.22	10.23	2,737	615,302	3,086	693,760	3,417	768,172	2,198	494,130	2,479	557,301	2,745	617,101
	59		4.12	15.74	10.58	2,832	636,659	3,193	717,815	3,536	794,924	2,275	511,440	2,565	576,635	2,840	638,457
	60		4.19	16.28	10.94	2,929	658,465	3,302	742,319	3,657	822,126	2,353	528,975	2,652	596,193	2,937	660,264
	60.33	2 3/8	4.22	16.46	11.06	2,962	665,884	3,339	750,637	3,697	831,119	2,379	534,820	2,682	602,938	2,970	667,683
	61		4.26	16.83	11.31	3,028	680,721	3,413	767,273	3,780	849,778	2,432	546,735	2,742	616,426	3,036	682,520
	62		4.33	17.39	11.69	3,128	703,202	3,526	792,676	3,905	877,879	2,512	564,720	2,832	636,659	3,136	705,001
	63		4.40	17.95	12.06	3,230	726,133	3,641	818,529	4,032	906,430	2,594	583,154	2,924	657,341	3,238	727,931
	63.5	2 1/2	4.44	18.24	12.26	3,281	737,598	3,699	831,568	4,096	920,817	2,635	592,372	2,971	667,907	3,290	739,621
	64		4.47	18.53	12.45	3,333	749,288	3,757	844,607	4,161	935,430	2,677	601,814	3,018	678,473	3,342	751,311
	65		4.54	19.11	12.84	3,438	772,893	3,876	871,359	4,292	964,880	2,761	620,697	3,113	699,830	3,447	774,916

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

12MINE 460(P)

12-strand rotation resistant rope with optional PLASTFILL® insert between the steel core and the outer strands. All strands are compacted using Teufelberger-Redaelli SUPERFILL® compaction technology, which significantly increases the rope's wear resistance and breaking force. Suitable for use with friction and drum winders.

BEST STRENGTH TO WEIGHT RATIO

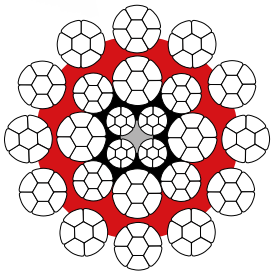
Specifications

- Lang lay or ordinary lay, right and left lay
- 19 – 65 mm: 12xK7-EPIWRC(K) (or IWRC(K))
- Conformity: EN 12385-6 (other standards available upon request)
- Use with or without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✔ PLASTFILL®

Benefits

- Rotation resistant
- High breaking force
- High resistance to wear and drum crushing
- Good flexibility and bending fatigue performance
- Low rope elongation
- High radial stability
- Improved shock resistance with PLASTFILL®



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
12xK7-IWRC(K) or 12xK7-EPIWRC(K)	19	3/4	1.31	1.66	1.12	302	67,892	341	76,660	377	84,753	242	54,404	273	61,373	302	67,892
	20		1.38	1.84	1.24	335	75,311	377	84,753	418	93,970	268	60,249	302	67,892	335	75,311
	21		1.44	2.03	1.36	369	82,955	416	93,521	461	103,637	296	66,543	334	75,086	369	82,955
	22		1.51	2.23	1.50	405	91,048	457	102,738	506	113,753	325	73,063	366	82,280	405	91,048
	22.23	7/8	1.53	2.27	1.53	414	93,071	466	104,761	516	116,001	331	74,412	374	84,079	414	93,071
	23		1.58	2.43	1.63	443	99,590	499	112,180	553	124,319	355	79,807	400	89,924	443	99,590
	24		1.65	2.65	1.78	482	108,358	543	122,071	602	135,335	386	86,776	436	98,017	482	108,358
	25		1.72	2.88	1.94	523	117,575	590	132,637	653	146,800	419	94,195	473	106,335	523	117,575
	25.4	1	1.75	2.97	2.00	540	121,397	609	136,909	674	151,521	433	97,342	488	109,707	540	121,397
	26		1.79	3.11	2.09	566	127,242	638	143,428	706	158,715	453	101,838	511	114,877	566	127,242
	27		1.86	3.36	2.26	610	137,133	688	154,669	762	171,304	489	109,932	551	123,870	610	137,133
	28		1.93	3.61	2.43	656	147,475	740	166,359	819	184,119	526	118,250	593	133,312	657	147,699
	28.58	1 1/8	1.97	3.76	2.53	684	153,769	771	173,328	853	191,762	548	123,195	618	138,932	684	153,769
	29		2.00	3.87	2.60	704	158,265	793	178,273	879	197,607	564	126,792	636	142,978	704	158,265
	30		2.06	4.14	2.78	753	169,281	849	190,863	940	211,320	604	135,785	681	153,095	754	169,506

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
12xK7-IWRC(K) or 12xK7-EPIWRC(K)	31		2.13	4.42	2.97	804	180,746	907	203,902	1,004	225,708	645	145,002	727	163,436	805	180,971
	31.75	1 1/4	2.18	4.64	3.12	844	189,739	951	213,793	1,053	236,724	676	151,971	762	171,304	844	189,739
	32		2.20	4.71	3.16	857	192,661	966	217,165	1,070	240,546	687	154,444	774	174,002	858	192,886
	33		2.27	5.01	3.37	911	204,801	1,027	230,879	1,138	255,833	730	164,111	824	185,243	912	205,026
	34		2.34	5.32	3.57	967	217,390	1,091	245,267	1,208	271,569	775	174,227	874	196,483	968	217,615
	35	1 3/8	2.41	5.64	3.79	1,025	230,429	1,156	259,879	1,280	287,755	822	184,793	926	208,173	1,026	230,654
	36		2.48	5.97	4.01	1,085	243,918	1,223	274,941	1,354	304,391	869	195,359	980	220,313	1,085	243,918
	37		2.55	6.30	4.23	1,146	257,631	1,292	290,453	1,430	321,477	918	206,375	1,035	232,677	1,146	257,631
	38	1 1/2	2.61	6.65	4.47	1,208	271,569	1,362	306,190	1,509	339,237	969	217,840	1,092	245,491	1,209	271,794
	39		2.68	7.00	4.70	1,273	286,182	1,435	322,601	1,589	357,221	1,020	229,305	1,150	258,530	1,274	286,407
	40		2.75	7.36	4.95	1,339	301,019	1,509	339,237	1,671	375,656	1,073	241,220	1,210	272,019	1,340	301,244
	41		2.82	7.74	5.20	1,407	316,306	1,586	356,547	1,756	394,765	1,128	253,584	1,271	285,732	1,408	316,531
	41.28	1 5/8	2.84	7.84	5.27	1,426	320,578	1,608	361,493	1,780	400,160	1,143	256,957	1,289	289,779	1,427	320,802
	42		2.89	8.12	5.46	1,476	331,818	1,664	374,082	1,843	414,323	1,183	265,949	1,334	299,895	1,477	332,043
	43		2.96	8.51	5.72	1,547	347,779	1,744	392,067	1,932	434,331	1,240	278,763	1,398	314,283	1,548	348,004
	44		3.03	8.91	5.99	1,620	364,190	1,826	410,501	2,023	454,788	1,299	292,027	1,464	329,120	1,621	364,415
	44.45	1 3/4	3.06	9.09	6.11	1,653	371,609	1,864	419,044	2,064	464,006	1,325	297,872	1,494	335,865	1,655	372,059
	45		3.10	9.32	6.26	1,695	381,051	1,910	429,385	2,115	475,471	1,358	305,291	1,531	344,182	1,696	381,276
	46		3.17	9.74	6.54	1,771	398,137	1,996	448,719	2,211	497,053	1,419	319,004	1,600	359,694	1,772	398,361
	47		3.23	10.17	6.83	1,849	415,672	2,084	468,502	2,308	518,859	1,482	333,167	1,671	375,656	1,850	415,897
	47.63	1 7/8	3.28	10.44	7.02	1,898	426,687	2,140	481,091	2,370	532,797	1,522	342,159	1,716	385,772	1,900	427,137
	48		3.30	10.61	7.13	1,928	433,432	2,174	488,735	2,407	541,115	1,546	347,555	1,742	391,617	1,929	433,656
	49		3.37	11.05	7.43	2,009	451,641	2,265	509,192	2,508	563,821	1,611	362,167	1,816	408,253	2,011	452,091
	50		3.44	11.51	7.73	2,092	470,300	2,359	530,324	2,612	587,201	1,677	377,005	1,891	425,114	2,094	470,750
	50.8	2	3.50	11.88	7.98	2,160	485,587	2,435	547,410	2,696	606,085	1,731	389,144	1,952	438,827	2,161	485,812
	51		3.51	11.97	8.04	2,177	489,409	2,454	551,681	2,717	610,806	1,745	392,292	1,967	442,199	2,178	489,634
	52		3.58	12.45	8.37	2,263	508,743	2,551	573,488	2,825	635,085	1,814	407,803	2,045	459,734	2,264	508,967
	53		3.65	12.93	8.69	2,351	528,526	2,650	595,744	2,935	659,814	1,884	423,540	2,124	477,494	2,352	528,751
	54	2 1/8	3.72	13.42	9.02	2,440	548,534	2,751	618,449	3,046	684,768	1,956	439,726	2,205	495,704	2,442	548,983
	55		3.78	13.92	9.35	2,531	568,991	2,854	641,605	3,160	710,396	2,029	456,137	2,288	514,363	2,533	569,441
	56		3.85	14.43	9.70	2,624	589,899	2,959	665,210	3,276	736,474	2,104	472,998	2,372	533,247	2,626	590,348
	57		3.92	14.95	10.05	2,719	611,256	3,065	689,039	3,394	763,002	2,179	489,859	2,457	552,356	2,721	611,705
	57.15	2 1/4	3.93	15.03	10.10	2,733	614,403	3,081	692,636	3,412	767,048	2,191	492,556	2,470	555,278	2,735	614,852
	58		3.99	15.48	10.40	2,815	632,837	3,174	713,544	3,514	789,979	2,257	507,394	2,544	571,914	2,817	633,287
	59		4.06	16.02	10.76	2,913	654,868	3,284	738,273	3,637	817,630	2,335	524,929	2,632	591,697	2,915	655,318
	60		4.13	16.57	11.13	3,013	677,349	3,396	763,451	3,761	845,506	2,415	542,914	2,722	611,930	3,015	677,799
	60.33	2 3/8	4.15	16.75	11.26	3,046	684,768	3,434	771,994	3,802	854,724	2,441	548,759	2,753	618,899	3,048	685,218
	61		4.20	17.13	11.51	3,114	700,055	3,510	789,079	3,887	873,832	2,496	561,123	2,814	632,612	3,116	700,505
	62		4.27	17.69	11.89	3,217	723,210	3,626	815,157	4,016	902,833	2,579	579,782	2,907	653,520	3,219	723,660
	63		4.33	18.27	12.28	3,321	746,591	3,744	841,685	4,146	932,058	2,662	598,441	3,002	674,876	3,324	747,265
	63.5	2 1/2	4.37	18.56	12.47	3,374	758,505	3,804	855,173	4,212	946,895	2,705	608,108	3,049	685,442	3,377	759,180
	64		4.40	18.85	12.67	3,428	770,645	3,864	868,662	4,279	961,957	2,748	617,775	3,098	696,458	3,430	771,095
	65		4.47	19.45	13.07	3,536	794,924	3,986	896,088	4,414	992,307	2,834	637,109	3,195	718,265	3,538	795,374

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

FLEXMINE® 400(P)

15-strand rotation resistant hoist rope with optional PLASTFILL® insert between the steel core and the outer strands. A high performance hoist rope for Koepe friction winders and single-layer drum winders when rope elongation, twist and bending fatigue matter.

ROTATION RESISTANT HIGH PERFORMER

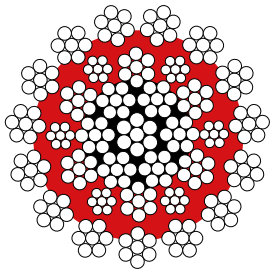
Specifications

- Lang lay or ordinary lay, right and left lay
- 19 – 65 mm: 15x7-EPIWRC (or IWRC)
- Conformity: EN 12385-6 (22-65 mm) / EN 12385-4 (19-21 mm) (other standards available upon request)
- Use with or without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✘ SUPERFILL®
✔ PLASTFILL®

Benefits

- Rotation resistant
- Good breaking force
- High flexibility and bending fatigue performance
- Very low rope elongation
- Excellent radial stability
- Improved shock resistance with PLASTFILL®



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
15x7-IWRC or 15x7-EPIWRC	19	3/4	0.99	1.55	1.04	270	60,698	305	68,567	337	75,761	215	48,334	242	54,404	268	60,249
	20		1.04	1.72	1.16	299	67,218	337	75,761	374	84,079	238	53,505	268	60,249	297	66,768
	21		1.09	1.90	1.28	330	74,187	372	83,629	412	92,621	262	58,900	295	66,319	327	73,513
	22		1.14	2.08	1.40	362	81,381	408	91,722	452	101,614	288	64,745	324	72,838	359	80,706
	22.23	7/8	1.16	2.12	1.42	370	83,179	417	93,745	462	103,862	294	66,094	331	74,412	367	82,505
	23		1.20	2.27	1.53	396	89,024	446	100,265	494	111,056	314	70,590	354	79,582	393	88,350
	24		1.25	2.48	1.67	431	96,893	486	109,257	538	120,947	342	76,885	386	86,776	427	95,993
	25		1.30	2.69	1.81	468	105,211	527	118,474	584	131,288	371	83,404	419	94,195	464	104,311
	25.4	1	1.32	2.77	1.86	483	108,583	544	122,296	603	135,560	383	86,102	432	97,117	479	107,683
	26		1.35	2.91	1.96	506	113,753	570	128,141	632	142,079	402	90,373	453	101,838	502	112,854
	27		1.40	3.13	2.10	546	122,746	615	138,258	681	153,095	433	97,342	488	109,707	541	121,622
	28		1.46	3.37	2.26	587	131,963	661	148,599	732	164,560	466	104,761	525	118,025	582	130,839
	28.58	1 1/8	1.49	3.51	2.36	611	137,358	689	154,893	763	171,529	485	109,032	547	122,970	606	136,234
	29		1.51	3.62	2.43	629	141,405	709	159,390	786	176,700	500	112,404	564	126,792	624	140,281
	30		1.56	3.87	2.60	673	151,296	759	170,630	841	189,064	535	120,273	603	135,560	668	150,172

Rope diameters marked with this color are available only according to EN 12385-4.

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
15x7-IWRC or 15x7-EPIWRC	31		1.61	4.13	2.78	719	161,638	811	182,320	898	201,878	571	128,366	644	144,777	713	160,289
	31.75	1 1/4	1.65	4.33	2.91	754	169,506	850	191,088	942	211,770	599	134,661	675	151,746	748	168,157
	32		1.66	4.40	2.96	766	172,204	864	194,235	957	215,142	609	136,909	686	154,219	760	170,855
	33		1.72	4.68	3.14	815	183,219	919	206,599	1,017	228,631	647	145,451	730	164,111	808	181,646
	34		1.77	4.97	3.34	865	194,460	975	219,189	1,080	242,794	687	154,444	775	174,227	858	192,886
	35	1 3/8	1.82	5.27	3.54	917	206,150	1,033	232,228	1,144	257,181	728	163,661	821	184,568	909	204,351
	36		1.87	5.57	3.74	970	218,065	1,093	245,716	1,211	272,244	770	173,103	868	195,134	962	216,266
	37		1.92	5.88	3.95	1,024	230,204	1,155	259,654	1,279	287,531	814	182,994	917	206,150	1,016	228,406
	38	1 1/2	1.98	6.21	4.17	1,081	243,018	1,218	273,817	1,349	303,267	858	192,886	968	217,615	1,071	240,770
	39		2.03	6.54	4.39	1,138	255,833	1,283	288,430	1,421	319,454	904	203,227	1,019	229,080	1,129	253,809
	40		2.08	6.88	4.62	1,197	269,096	1,350	303,492	1,495	336,089	951	213,793	1,072	240,995	1,187	266,848
	41		2.13	7.23	4.86	1,258	282,810	1,418	318,779	1,570	352,950	999	224,584	1,126	253,135	1,247	280,337
	41.28	1 5/8	2.15	7.33	4.93	1,275	286,631	1,438	323,275	1,592	357,896	1,013	227,731	1,142	256,732	1,264	284,159
	42		2.18	7.58	5.09	1,320	296,748	1,488	334,516	1,648	370,485	1,048	235,600	1,182	265,724	1,309	294,275
	43		2.24	7.95	5.34	1,384	311,136	1,560	350,702	1,727	388,245	1,099	247,065	1,239	278,538	1,372	308,438
	44		2.29	8.32	5.59	1,449	325,748	1,633	367,113	1,809	406,679	1,151	258,755	1,297	291,577	1,436	322,826
	44.45	1 3/4	2.31	8.49	5.71	1,478	332,268	1,667	374,757	1,846	414,997	1,174	263,926	1,324	297,647	1,466	329,570
	45		2.34	8.70	5.85	1,515	340,586	1,708	383,974	1,892	425,339	1,204	270,670	1,357	305,066	1,503	337,888
	46		2.39	9.10	6.11	1,583	355,873	1,785	401,284	1,977	444,447	1,258	282,810	1,418	318,779	1,570	352,950
	47		2.44	9.50	6.38	1,653	371,609	1,864	419,044	2,064	464,006	1,313	295,174	1,480	332,717	1,639	368,462
	47.63	1 7/8	2.48	9.75	6.55	1,698	381,726	1,914	430,284	2,119	476,370	1,348	303,042	1,520	341,710	1,683	378,353
	48		2.50	9.90	6.65	1,724	387,571	1,944	437,029	2,152	483,789	1,369	307,763	1,544	347,105	1,710	384,423
	49		2.55	10.32	6.93	1,797	403,982	2,026	455,463	2,243	504,246	1,427	320,802	1,609	361,718	1,781	400,385
	50		2.60	10.75	7.22	1,871	420,618	2,109	474,122	2,335	524,929	1,486	334,066	1,675	376,555	1,855	417,021
	50.8	2	2.64	11.09	7.45	1,931	434,106	2,177	489,409	2,411	542,014	1,534	344,857	1,729	388,695	1,915	430,509
	51		2.65	11.18	7.51	1,946	437,478	2,194	493,231	2,430	546,286	1,546	347,555	1,743	391,842	1,930	433,881
	52		2.70	11.62	7.81	2,023	454,788	2,281	512,789	2,526	567,867	1,607	361,268	1,812	407,354	2,006	450,967
	53		2.75	12.07	8.11	2,102	472,548	2,370	532,797	2,624	589,899	1,670	375,431	1,882	423,090	2,084	468,502
	54	2 1/8	2.81	12.53	8.42	2,182	490,533	2,460	553,030	2,724	612,380	1,733	389,594	1,954	439,277	2,164	486,487
	55		2.86	13.00	8.74	2,264	508,967	2,552	573,712	2,826	635,310	1,798	404,206	2,027	455,688	2,244	504,471
	56		2.91	13.48	9.06	2,347	527,627	2,646	594,844	2,930	658,690	1,864	419,044	2,101	472,324	2,327	523,130
	57		2.96	13.97	9.39	2,431	546,511	2,741	616,201	3,035	682,295	1,931	434,106	2,177	489,409	2,411	542,014
	57.15	2 1/4	2.97	14.04	9.43	2,444	549,433	2,755	619,349	3,051	685,892	1,941	436,354	2,188	491,882	2,423	544,712
	58		3.01	14.46	9.72	2,517	565,844	2,838	638,008	3,143	706,575	1,999	449,393	2,254	506,719	2,496	561,123
	59		3.07	14.96	10.05	2,605	585,627	2,937	660,264	3,252	731,079	2,069	465,130	2,332	524,254	2,583	580,682
	60		3.12	15.48	10.40	2,694	605,635	3,037	682,745	3,363	756,032	2,140	481,091	2,412	542,239	2,671	600,465
	60.33	2 3/8	3.14	15.65	10.52	2,724	612,380	3,071	690,388	3,400	764,350	2,163	486,262	2,439	548,309	2,701	607,209
	61		3.17	16.00	10.75	2,784	625,868	3,139	705,675	3,476	781,436	2,212	497,277	2,493	560,449	2,761	620,697
	62		3.22	16.52	11.10	2,876	646,551	3,243	729,055	3,591	807,289	2,285	513,688	2,576	579,108	2,852	641,155
	63		3.27	17.06	11.46	2,970	667,683	3,348	752,660	3,708	833,592	2,359	530,324	2,659	597,767	2,945	662,062
	63.5	2 1/2	3.30	17.33	11.65	3,017	678,249	3,402	764,800	3,767	846,855	2,397	538,867	2,702	607,434	2,992	672,628
	64		3.33	17.61	11.83	3,065	689,039	3,455	776,715	3,826	860,119	2,434	547,185	2,745	617,101	3,039	683,194
	65		3.38	18.16	12.20	3,162	710,846	3,564	801,219	3,947	887,321	2,511	564,495	2,831	636,434	3,135	704,776

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

FLEXMINE® 440(P)

15-strand rotation resistant rope with optional PLASTFILL® insert between the steel core and the outer strands. Compacted outer strands with Teufelberger-Redaelli SUPERFILL® compaction technology make the rope wear resistant and ideal for multi-layer drum winders but also suitable for single-layer drum and Koepe friction winders.

ROTATION AND WEAR RESISTANT HIGH PERFORMER

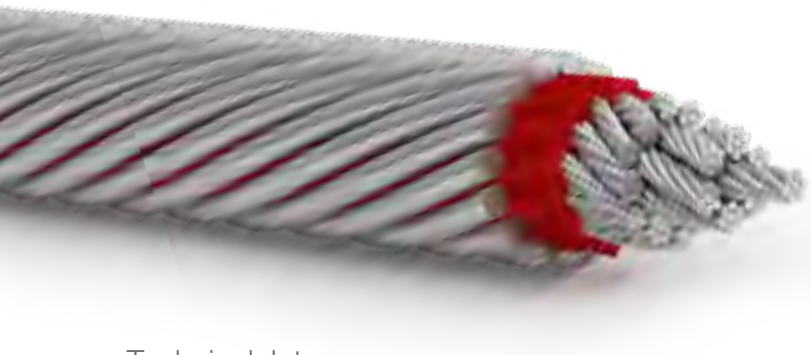
Specifications

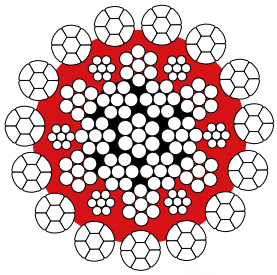
- Lang lay or ordinary lay, right and left lay
- 19 – 65 mm: 15xK7-EPIWRC (or IWRC)
- Conformity: EN 12385-6 (22-65 mm) / EN 12385-4 (19-21 mm) (other standards available upon request)
- Use with or without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✔ PLASTFILL®

Benefits

- Rotation resistant
- Good breaking force
- High resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Very low rope elongation
- Excellent radial stability
- Improved shock resistance with PLASTFILL®





Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
15xK7-IWRC or 15xK7-EPIWRC	19	3/4	1.08	1.65	1.11	295	66,319	333	74,861	368	82,730	229	51,481	258	58,001	286	64,295
	20		1.14	1.83	1.23	327	73,513	369	82,955	408	91,722	254	57,101	286	64,295	317	71,264
	21		1.20	2.01	1.35	360	80,931	406	91,272	450	101,164	280	62,947	316	71,040	350	78,683
	22		1.25	2.21	1.49	396	89,024	446	100,265	494	111,056	307	69,016	347	78,009	384	86,327
	22.23	7/8	1.27	2.26	1.52	404	90,823	455	102,288	504	113,304	314	70,590	354	79,582	392	88,125
	23		1.31	2.42	1.63	432	97,117	487	109,482	540	121,397	336	75,536	379	85,203	419	94,195
	24		1.37	2.63	1.77	471	105,885	531	119,374	588	132,188	366	82,280	412	92,621	457	102,738
	25		1.42	2.86	1.92	511	114,877	576	129,490	638	143,428	397	89,249	447	100,490	495	111,280
	25.4	1	1.45	2.95	1.98	527	118,474	594	133,537	658	147,924	410	92,172	462	103,862	511	114,877
	26		1.48	3.09	2.08	552	124,095	623	140,056	690	155,118	429	96,443	484	108,808	536	120,498
	27		1.54	3.33	2.24	596	133,986	672	151,072	744	167,258	463	104,087	522	117,350	578	129,940
	28		1.59	3.58	2.41	641	144,103	722	162,312	800	179,847	498	111,955	561	126,118	622	139,831
	28.58	1 1/8	1.63	3.73	2.51	667	149,948	753	169,281	833	187,266	519	116,676	585	131,513	648	145,676
	29		1.65	3.84	2.58	687	154,444	775	174,227	858	192,886	534	120,048	602	135,335	667	149,948
	30		1.71	4.11	2.76	735	165,235	829	186,367	918	206,375	572	128,591	644	144,777	714	160,514

Rope diameters marked with this color are available only according to EN 12385-4.

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
15xK7-IWRC or 15xK7-EPIWRC	31		1.76	4.39	2.95	785	176,475	885	198,956	980	220,313	610	137,133	688	154,669	762	171,304
	31.75	1 1/4	1.81	4.61	3.10	824	185,243	929	208,848	1,028	231,104	640	143,878	722	162,312	799	179,622
	32		1.82	4.68	3.14	837	188,165	943	211,995	1,045	234,925	650	146,126	733	164,785	812	182,545
	33		1.88	4.98	3.35	890	200,080	1,003	225,483	1,111	249,763	692	155,568	780	175,351	863	194,010
	34		1.94	5.28	3.55	945	212,444	1,065	239,422	1,179	265,050	734	165,010	828	186,142	916	205,925
	35	1 3/8	1.99	5.60	3.76	1,001	225,034	1,129	253,809	1,250	281,011	778	174,901	877	197,157	971	218,289
	36		2.05	5.92	3.98	1,059	238,073	1,194	268,422	1,322	297,197	823	185,018	928	208,623	1,027	230,879
	37		2.11	6.25	4.20	1,119	251,561	1,261	283,484	1,397	314,058	869	195,359	980	220,313	1,085	243,918
	38	1 1/2	2.16	6.60	4.43	1,180	265,275	1,330	298,996	1,473	331,144	917	206,150	1,034	232,452	1,145	257,406
	39		2.22	6.95	4.67	1,243	279,438	1,401	314,957	1,552	348,903	966	217,165	1,089	244,817	1,206	271,120
	40		2.28	7.31	4.91	1,307	293,825	1,474	331,368	1,632	366,888	1,016	228,406	1,145	257,406	1,268	285,058
	41		2.33	7.68	5.16	1,374	308,887	1,549	348,229	1,715	385,547	1,067	239,871	1,203	270,445	1,333	299,670
	41.28	1 5/8	2.35	7.79	5.23	1,393	313,159	1,570	352,950	1,738	390,718	1,082	243,243	1,220	274,267	1,351	303,717
	42		2.39	8.06	5.42	1,442	324,174	1,625	365,315	1,800	404,656	1,120	251,786	1,263	283,934	1,398	314,283
	43		2.45	8.45	5.68	1,511	339,686	1,703	382,850	1,886	423,990	1,174	263,926	1,324	297,647	1,466	329,570
	44		2.50	8.85	5.95	1,582	355,648	1,784	401,059	1,975	443,998	1,229	276,290	1,386	311,585	1,535	345,082
	44.45	1 3/4	2.53	9.03	6.07	1,615	363,066	1,820	409,152	2,016	453,215	1,255	282,135	1,415	318,105	1,566	352,051
	45		2.56	9.25	6.22	1,655	372,059	1,866	419,493	2,066	464,455	1,286	289,104	1,450	325,973	1,605	360,818
	46		2.62	9.67	6.50	1,729	388,695	1,949	438,153	2,159	485,363	1,344	302,143	1,515	340,586	1,678	377,229
	47		2.68	10.09	6.78	1,805	405,780	2,035	457,486	2,254	506,719	1,403	315,407	1,581	355,423	1,751	393,640
	47.63	1 7/8	2.71	10.36	6.96	1,854	416,796	2,090	469,851	2,314	520,208	1,441	323,950	1,624	365,090	1,799	404,431
	48		2.73	10.53	7.08	1,883	423,315	2,123	477,269	2,350	528,301	1,463	328,895	1,650	370,935	1,827	410,726
	49		2.79	10.97	7.37	1,962	441,075	2,212	497,277	2,449	550,557	1,525	342,834	1,719	386,447	1,903	427,811
	50		2.85	11.42	7.67	2,043	459,285	2,303	517,735	2,550	573,263	1,588	356,997	1,790	402,408	1,982	445,571
	50.8	2	2.89	11.79	7.92	2,109	474,122	2,377	534,371	2,633	591,922	1,639	368,462	1,848	415,447	2,046	459,959
	51		2.90	11.88	7.98	2,125	477,719	2,396	538,642	2,653	596,418	1,652	371,384	1,862	418,594	2,062	463,556
	52		2.96	12.35	8.30	2,210	496,828	2,491	559,999	2,759	620,248	1,717	385,997	1,936	435,230	2,144	481,990
	53		3.02	12.83	8.62	2,295	515,937	2,588	581,806	2,866	644,302	1,784	401,059	2,011	452,091	2,227	500,650
	54	2 1/8	3.07	13.32	8.95	2,383	535,720	2,686	603,837	2,975	668,807	1,852	416,346	2,088	469,401	2,312	519,758
	55		3.13	13.82	9.29	2,472	555,728	2,787	626,543	3,086	693,760	1,921	431,858	2,166	486,936	2,398	539,092
	56		3.19	14.33	9.63	2,563	576,185	2,889	649,473	3,199	719,164	1,991	447,595	2,245	504,696	2,486	558,875
	57		3.24	14.84	9.97	2,655	596,868	2,993	672,853	3,315	745,242	2,063	463,781	2,326	522,906	2,576	579,108
	57.15	2 1/4	3.25	14.92	10.03	2,669	600,015	3,009	676,450	3,332	749,063	2,074	466,254	2,338	525,603	2,589	582,030
	58		3.30	15.37	10.33	2,749	618,000	3,099	696,683	3,432	771,544	2,136	480,192	2,408	541,340	2,667	599,565
	59		3.36	15.90	10.68	2,845	639,581	3,207	720,962	3,551	798,297	2,211	497,053	2,492	560,224	2,760	620,473
	60		3.42	16.45	11.05	2,942	661,388	3,317	745,691	3,673	825,723	2,286	513,913	2,577	579,333	2,854	641,605
	60.33	2 3/8	3.43	16.63	11.17	2,974	668,582	3,353	753,784	3,713	834,716	2,311	519,533	2,606	585,852	2,885	648,574
	61		3.47	17.00	11.42	3,041	683,644	3,428	770,645	3,796	853,375	2,363	531,224	2,664	598,891	2,950	663,186
	62		3.53	17.56	11.80	3,141	706,125	3,541	796,048	3,922	881,701	2,441	548,759	2,752	618,674	3,047	684,993
	63		3.59	18.13	12.18	3,243	729,055	3,657	822,126	4,049	910,251	2,520	566,519	2,842	638,907	3,147	707,474
	63.5	2 1/2	3.62	18.42	12.38	3,295	740,745	3,715	835,165	4,114	924,864	2,561	575,736	2,887	649,023	3,197	718,714
	64		3.64	18.71	12.57	3,347	752,436	3,774	848,429	4,179	939,477	2,601	584,728	2,932	659,140	3,247	729,955
	65		3.70	19.30	12.97	3,453	776,265	3,892	874,956	4,310	968,927	2,683	603,162	3,025	680,047	3,349	752,885

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

FLEXMINE® 460(P)

15-strand rotation resistant rope with optional PLASTFILL® insert between the steel core and the outer strands. All strands are compacted using Teufelberger-Redaelli SUPERFILL® compaction technology, which significantly increases the rope's wear resistance and breaking force. Suitable for use with friction and drum winders.

ROTATION AND WEAR RESISTANT HIGH PERFORMER WITH INCREASED STRENGTH

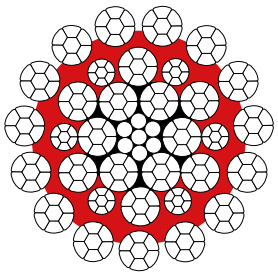
Specifications

- Lang lay or ordinary lay, right and left lay
- 19 – 65 mm: 15xK7-EPIWRC(K) (or IWRC(K))
- Conformity: EN 12385-6 (20-65 mm) / EN 12385-4 (19 mm) (other standards available upon request)
- Use with or without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✔ PLASTFILL®

Benefits

- Rotation resistant
- High breaking force
- High resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Very low rope elongation
- Excellent radial stability
- Improved shock resistance with PLASTFILL®



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
15xK7-IWRC(K) or 15xK7-EPIWRC(K)	19	3/4	1.08	1.75	1.18	320	71,939	361	81,156	400	89,924	249	55,977	281	63,171	311	69,916
	20		1.14	1.94	1.30	355	79,807	400	89,924	443	99,590	276	62,047	311	69,916	345	77,559
	21		1.20	2.14	1.44	391	87,900	441	99,141	488	109,707	305	68,567	343	77,109	380	85,427
	22		1.25	2.35	1.58	429	96,443	484	108,808	536	120,498	334	75,086	377	84,753	417	93,745
	22.23	7/8	1.27	2.40	1.61	438	98,466	494	111,056	547	122,970	341	76,660	385	86,551	426	95,769
	23		1.31	2.56	1.72	469	105,435	529	118,924	586	131,738	365	82,055	412	92,621	456	102,513
	24		1.37	2.79	1.87	511	114,877	576	129,490	638	143,428	398	89,474	448	100,714	497	111,730
	25		1.42	3.03	2.04	555	124,769	625	140,506	692	155,568	432	97,117	487	109,482	539	121,172
	25.4	1	1.45	3.13	2.10	572	128,591	645	145,002	715	160,738	445	100,040	502	112,854	556	124,994
	26		1.48	3.28	2.20	600	134,885	676	151,971	749	168,382	467	104,986	526	118,250	583	131,064
	27		1.54	3.53	2.37	647	145,451	729	163,886	808	181,646	503	113,079	568	127,691	628	141,180
	28		1.59	3.80	2.55	696	156,467	784	176,250	868	195,134	541	121,622	610	137,133	676	151,971
	28.58	1 1/8	1.63	3.96	2.66	725	162,986	817	183,669	905	203,452	564	126,792	636	142,978	704	158,265
	29		1.65	4.08	2.74	746	167,707	841	189,064	932	209,522	581	130,614	655	147,250	725	162,986
	30		1.71	4.36	2.93	799	179,622	900	202,328	997	224,135	621	139,606	701	157,591	776	174,452

Rope diameters marked with this color are available only according to EN 12385-4.

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
15xK7-IWRC(K) or 15xK7-EPIWRC(K)	31		1.76	4.66	3.13	853	191,762	961	216,041	1,064	239,197	664	149,273	748	168,157	828	186,142
	31.75	1 1/4	1.81	4.89	3.29	894	200,979	1,008	226,607	1,117	251,112	696	156,467	785	176,475	869	195,359
	32		1.82	4.96	3.33	909	204,351	1,024	230,204	1,134	254,933	707	158,940	797	179,173	883	198,506
	33		1.88	5.28	3.55	966	217,165	1,089	244,817	1,206	271,120	752	169,056	848	190,638	939	211,096
	34		1.94	5.60	3.76	1,026	230,654	1,156	259,879	1,281	287,980	798	179,398	900	202,328	997	224,135
	35	1 3/8	1.99	5.94	3.99	1,087	244,367	1,225	275,391	1,357	305,066	846	190,188	954	214,468	1,056	237,398
	36		2.05	6.28	4.22	1,150	258,530	1,296	291,352	1,436	322,826	895	201,204	1,009	226,832	1,117	251,112
	37		2.11	6.63	4.46	1,215	273,143	1,369	307,763	1,516	340,810	945	212,444	1,066	239,646	1,180	265,275
	38	1 1/2	2.16	7.00	4.70	1,281	287,980	1,444	324,624	1,600	359,694	997	224,135	1,124	252,685	1,245	279,887
	39		2.22	7.37	4.95	1,350	303,492	1,521	341,934	1,685	378,803	1,050	236,049	1,184	266,174	1,311	294,725
	40		2.28	7.75	5.21	1,420	319,229	1,601	359,919	1,772	398,361	1,105	248,414	1,246	280,112	1,379	310,012
	41		2.33	8.15	5.48	1,492	335,415	1,682	378,129	1,862	418,594	1,161	261,003	1,309	294,275	1,449	325,748
	41.28	1 5/8	2.35	8.26	5.55	1,512	339,911	1,705	383,299	1,888	424,439	1,177	264,600	1,327	298,321	1,469	330,244
	42		2.39	8.55	5.75	1,565	351,826	1,765	396,788	1,954	439,277	1,218	273,817	1,373	308,663	1,521	341,934
	43		2.45	8.96	6.02	1,641	368,911	1,850	415,897	2,048	460,409	1,277	287,081	1,439	323,500	1,594	358,345
	44		2.50	9.38	6.30	1,718	386,222	1,937	435,455	2,145	482,215	1,337	300,570	1,507	338,787	1,669	375,206
	44.45	1 3/4	2.53	9.58	6.44	1,753	394,090	1,976	444,222	2,189	492,107	1,364	306,639	1,538	345,756	1,703	382,850
	45		2.56	9.81	6.59	1,797	403,982	2,026	455,463	2,243	504,246	1,398	314,283	1,576	354,299	1,746	392,516
	46		2.62	10.26	6.89	1,878	422,191	2,117	475,921	2,344	526,952	1,461	328,446	1,647	370,260	1,824	410,052
	47		2.68	10.71	7.20	1,960	440,626	2,210	496,828	2,447	550,107	1,525	342,834	1,720	386,671	1,904	428,036
	47.63	1 7/8	2.71	10.99	7.38	2,013	452,540	2,269	510,091	2,513	564,945	1,567	352,276	1,766	397,013	1,956	439,726
	48		2.73	11.17	7.51	2,044	459,509	2,305	518,185	2,552	573,712	1,591	357,671	1,794	403,307	1,986	446,471
	49		2.79	11.64	7.82	2,130	478,843	2,402	539,991	2,660	597,992	1,658	372,733	1,869	420,168	2,070	465,355
	50		2.85	12.12	8.14	2,218	498,626	2,501	562,247	2,769	622,496	1,726	388,020	1,946	437,478	2,155	484,463
	50.8	2	2.89	12.51	8.41	2,290	514,812	2,581	580,232	2,859	642,729	1,782	400,610	2,009	451,641	2,225	500,200
	51		2.90	12.61	8.47	2,308	518,859	2,602	584,953	2,881	647,675	1,796	403,757	2,025	455,238	2,242	504,022
	52		2.96	13.11	8.81	2,399	539,317	2,705	608,108	2,995	673,303	1,867	419,718	2,105	473,223	2,331	524,030
	53		3.02	13.61	9.15	2,492	560,224	2,810	631,713	3,112	699,605	1,940	436,129	2,187	491,657	2,422	544,487
	54	2 1/8	3.07	14.13	9.49	2,587	581,581	2,917	655,768	3,230	726,133	2,014	452,765	2,270	510,316	2,514	565,170
	55		3.13	14.66	9.85	2,684	603,387	3,026	680,272	3,351	753,335	2,089	469,626	2,355	529,425	2,608	586,302
	56		3.19	15.20	10.21	2,783	625,643	3,137	705,226	3,474	780,986	2,165	486,711	2,441	548,759	2,703	607,659
	57		3.24	15.75	10.58	2,883	648,124	3,250	730,629	3,599	809,087	2,244	504,471	2,529	568,542	2,801	629,690
	57.15	2 1/4	3.25	15.83	10.64	2,898	651,496	3,267	734,451	3,618	813,359	2,255	506,944	2,543	571,689	2,816	633,062
	58		3.30	16.30	10.95	2,985	671,055	3,365	756,482	3,726	837,638	2,323	522,231	2,619	588,775	2,900	651,946
	59		3.36	16.87	11.34	3,089	694,435	3,482	782,785	3,856	866,863	2,404	540,441	2,710	609,232	3,001	674,652
	60		3.42	17.45	11.73	3,194	718,040	3,601	809,537	3,988	896,538	2,486	558,875	2,803	630,139	3,103	697,582
	60.33	2 3/8	3.43	17.64	11.85	3,229	725,908	3,641	818,529	4,032	906,430	2,513	564,945	2,833	636,884	3,138	705,450
	61		3.47	18.03	12.12	3,302	742,319	3,722	836,739	4,122	926,662	2,569	577,534	2,897	651,272	3,208	721,187
	62		3.53	18.63	12.52	3,411	766,823	3,845	864,390	4,258	957,236	2,654	596,643	2,993	672,853	3,314	745,017
	63		3.59	19.24	12.93	3,522	791,777	3,970	892,492	4,396	988,260	2,741	616,201	3,090	694,660	3,421	769,071
	63.5	2 1/2	3.62	19.54	13.13	3,578	804,366	4,034	906,879	4,467	1,004,222	2,784	625,868	3,139	705,675	3,476	781,436
	64		3.64	19.85	13.34	3,634	816,956	4,097	921,042	4,537	1,019,958	2,828	635,760	3,189	716,916	3,531	793,800
	65		3.70	20.48	13.76	3,749	842,809	4,226	950,043	4,680	1,052,106	2,917	655,768	3,289	739,397	3,642	818,754

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

FLEXPACK® MINING(P)

Best-in-class 35x7 rotation resistant rope for use in a vast variety of heavy duty underground mining applications in challenging environments.

BEST-IN-CLASS 35X7 HEAVY DUTY WIRE ROPE

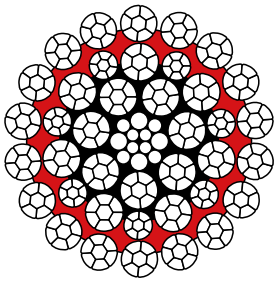
Specifications

- Lang lay or ordinary lay, right and left lay
- 19 – 40 mm: 15xK7-EPIWRC(K) (or IWRC(K)
- 41 – 65 mm: 18xK7-EPIWRC(K) (or IWRC(K)
- Conformity: EN 12385-6
  (other standards available upon request)
- Use with or without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✔ PLASTFILL®

Benefits

- Rotation resistant
- Very high breaking force
- Very high resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Very low rope elongation
- Excellent radial stability
- Improved shock resistance with PLASTFILL®



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
15xK7-IWRC(K) or 15xK7-EPIWRC(K)	19	3/4	1.20	1.86	1.25	372	83,615	419	94,267	464	104,386	285	64,046	321	72,204	353	79,331
	20		1.26	2.06	1.38	412	92,649	465	104,451	514	115,663	316	70,965	356	80,005	391	87,901
	21		1.33	2.27	1.52	454	102,145	512	115,157	567	127,519	348	78,239	392	88,205	431	96,911
	22		1.39	2.49	1.67	499	112,105	562	126,386	623	139,952	382	85,867	431	96,806	473	106,360
	22.23	7/8	1.40	2.54	1.71	509	114,410	574	128,984	635	142,830	390	87,633	439	98,796	483	108,547
	23		1.45	2.72	1.83	545	122,528	614	138,136	680	152,965	417	93,851	471	105,807	517	116,249
	24		1.52	2.96	1.99	593	133,414	669	150,409	741	166,555	455	102,189	512	115,207	563	126,577
	25		1.58	3.21	2.16	644	144,763	726	163,205	804	180,724	493	110,883	556	125,008	611	137,345
	25.4	1	1.61	3.32	2.23	665	149,433	749	168,469	830	186,553	509	114,459	574	129,040	631	141,775
	26		1.64	3.47	2.33	696	156,576	785	176,522	869	195,471	533	119,931	601	135,208	661	148,552
	27		1.71	3.75	2.52	751	168,852	847	190,362	938	210,796	575	129,333	649	145,809	713	160,199
	28		1.77	4.03	2.71	808	181,591	911	204,724	1008	226,700	619	139,091	698	156,810	766	172,286
	28.58	1 1/8	1.81	4.20	2.82	841	189,126	948	213,219	1050	236,106	644	144,862	726	163,316	798	179,434
	29		1.83	4.32	2.90	866	194,794	977	219,608	1082	243,182	664	149,204	748	168,210	822	184,812
	30		1.90	4.63	3.11	927	208,459	1045	235,015	1158	260,242	710	159,671	801	180,011	880	197,777

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
15xK7-IWRC(K) or 15xK7-EPIWRC(K)	31		1.96	4.94	3.32	990	222,588	1116	250,943	1236	277,881	758	170,493	855	192,212	939	211,182
	31.75	1 1/4	2.01	5.18	3.48	1039	233,489	1171	263,233	1297	291,489	796	178,842	897	201,625	985	221,524
	32		2.02	5.26	3.54	1055	237,180	1189	267,394	1317	296,098	808	181,670	911	204,813	1001	225,026
	33		2.09	5.60	3.76	1122	252,236	1265	284,368	1401	314,893	859	193,202	969	217,813	1065	239,310
	34		2.15	5.94	3.99	1191	267,754	1343	301,863	1487	334,267	912	205,088	1028	231,214	1130	254,034
	35	1 3/8	2.21	6.30	4.23	1262	283,736	1423	319,881	1576	354,219	967	217,330	1090	245,015	1197	269,196
	36		2.28	6.66	4.48	1335	300,181	1505	338,421	1667	374,749	1023	229,926	1153	259,216	1267	284,799
	37		2.34	7.04	4.73	1410	317,090	1590	357,483	1761	395,857	1080	242,877	1218	273,817	1338	300,841
	38	1 1/2	2.40	7.42	4.99	1488	334,461	1677	377,068	1857	417,544	1140	256,183	1285	288,818	1412	317,322
	39		2.47	7.82	5.25	1567	352,296	1767	397,175	1956	439,809	1200	269,844	1353	304,219	1487	334,243
	40		2.53	8.22	5.53	1648	370,594	1858	417,804	2058	462,653	1263	283,859	1424	320,020	1564	351,604
18xK7-IWRC(K) or 18xK7-EPIWRC(K)	41		2.18	8.41	5.65	1664	374,018	1876	421,664	2077	466,927	1295	291,240	1461	328,341	1604	360,677
	41.28	1 5/8	2.20	8.52	5.73	1686	379,052	1901	427,339	2105	473,212	1313	295,160	1480	332,760	1626	365,532
	42		2.24	8.83	5.93	1746	392,486	1968	442,484	2180	489,982	1359	305,620	1533	344,552	1684	378,486
	43		2.29	9.25	6.22	1830	411,398	2063	463,805	2285	513,592	1425	320,347	1606	361,155	1765	396,724
	44		2.34	9.69	6.51	1916	430,755	2160	485,629	2392	537,758	1492	335,420	1682	378,148	1848	415,391
	44.45	1 3/4	2.37	9.89	6.64	1955	439,611	2205	495,613	2441	548,814	1523	342,316	1717	385,923	1886	423,931
	45		2.40	10.13	6.81	2004	450,558	2259	507,953	2502	562,479	1561	350,839	1759	395,532	1933	434,486
	46		2.45	10.59	7.11	2094	470,805	2361	530,780	2614	587,756	1631	366,605	1838	413,307	2020	454,012
	47		2.50	11.05	7.43	2186	491,497	2465	554,108	2729	613,589	1702	382,718	1919	431,472	2108	473,966
	47.63	1 7/8	2.54	11.35	7.63	2245	504,656	2531	568,943	2802	630,016	1748	392,964	1971	443,023	2165	486,655
	48		2.56	11.53	7.75	2280	512,634	2571	577,938	2847	639,977	1776	399,177	2002	450,028	2199	494,349
	49		2.61	12.01	8.07	2376	534,217	2679	602,270	2967	666,920	1850	415,983	2086	468,974	2292	515,161
	50		2.66	12.51	8.40	2474	556,244	2789	627,103	3089	694,419	1927	433,135	2172	488,311	2386	536,403
	50.8	2	2.71	12.91	8.68	2554	574,186	2879	647,331	3189	716,818	1989	447,106	2242	504,062	2423	544,775
	51		2.72	13.01	8.74	2574	578,716	2902	652,438	3214	722,474	2005	450,634	2260	508,039	2442	549,073
	52		2.77	13.53	9.09	2676	601,633	3017	678,275	3341	751,084	2084	468,479	2349	528,157	2539	570,816
	53		2.82	14.05	9.44	2780	624,996	3134	704,613	3471	780,249	2165	486,670	2441	548,667	2638	592,981
	54	2 1/8	2.88	14.59	9.80	2886	648,803	3254	731,453	3603	809,970	2247	505,209	2534	569,566	2738	615,569
	55		2.93	15.13	10.17	2994	673,055	3375	758,795	3738	840,247	2331	524,093	2628	590,857	2841	638,579
	56		2.98	15.69	10.54	3104	697,752	3499	786,638	3875	871,079	2417	543,324	2725	612,538	2945	662,011
	57		3.04	16.26	10.92	3216	722,894	3625	814,983	4014	902,467	2504	562,902	2823	634,609	3051	685,866
	57,15	2 1/4	3.04	16.34	10.98	3233	726,704	3644	819,278	4036	907,223	2517	565,869	2838	637,954	3067	689,480
	58		3.09	16.83	11.31	3329	748,482	3754	843,830	4156	934,410	2593	582,826	2923	657,072	3159	710,142
	59		3.14	17.42	11.70	3445	774,514	3884	873,178	4301	966,909	2683	603,097	3024	679,925	3269	734,841
	60		3.20	18.01	12.10	3563	800,991	4017	903,028	4448	999,963	2774	623,714	3128	703,168	3380	759,962
	60.33	2 3/8	3.21	18.21	12.23	3602	809,692	4061	912,838	4496	1,010,826	2805	630,489	3162	710,807	3417	768,217
	61		3.25	18.62	12.51	3683	827,913	4152	933,380	4598	1,033,573	2868	644,678	3233	726,803	3494	785,505
	62		3.30	19.23	12.92	3804	855,281	4289	964,233	4750	1,067,739	2962	665,988	3340	750,827	3610	811,471
	63		3.36	19.86	13.34	3928	883,093	4429	995,589	4904	1,102,460	3059	687,645	3448	775,243	3727	837,858
	63.5	2 1/2	3.38	20.17	13.56	3991	897,166	4499	1,011,454	4982	1,120,028	3108	698,603	3503	787,597	3786	851,210
	64		3.41	20.49	13.77	4054	911,350	4570	1,027,445	5061	1,137,736	3157	709,648	3559	800,049	3846	864,668
	65		3.46	21.14	14.20	4182	940,052	4714	1,059,804	5220	1,173,568	3256	731,998	3671	825,246	3967	891,900

*Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

EXTRAFLEX EVO

Rotation resistant full-locked coil high performance hoist rope for drum and Koepe friction winder hoists. Our vast and long-standing experience in the development and production of full-locked coil ropes empowers us to offer this rope to the underground mining industry.

SIMPLY STRONG

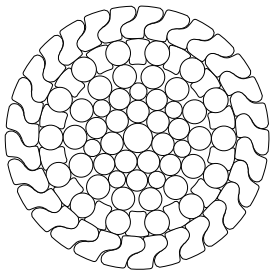
Specifications

- Right or left lay
- 22 – 38 mm
- Conformity: EN 12385-7 (other standards available upon request)
- Use with or without rope swivel
- Rope finish: bright, galvanized, ZnAl

- ✘ SUPERFILL®
- ✘ PLASTFILL®

Benefits

- Rotation resistant
- High breaking force
- High resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Very low rope elongation
- Excellent radial stability



Technical rope parameters upon request.

IPERFLEX®

18-strand rotation resistant balance rope for Koepe friction winders, featuring excellent flexibility, high bending fatigue performance and outstanding torque balance.

FLEXIBILITY COMBINED WITH EXCELLENT ROTATIONAL PROPERTIES

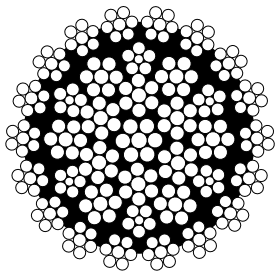
Specifications

- Lang lay or ordinary lay, right and left lay
- 30 – 58 mm: 18x7-IWRC
- Conformity: EN 12385-6 (other standards available upon request)
- Use with rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✘ SUPERFILL®
✘ PLASTFILL®

Benefits

- Rotation resistant
- Good breaking force
- High flexibility and bending fatigue performance
- Very low rope elongation
- Excellent radial stability



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1370		1570		1770		1370		1570		1770	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
18x7-IWRC	30		1.37	3.89	2.61	596	133,986	683	153,545	770	173,103	473	106,335	542	121,846	611	137,358
	31		1.41	4.16	2.80	636	142,978	729	163,886	822	184,793	505	113,529	578	129,940	652	146,575
	31.75	1¼	1.45	4.36	2.93	667	149,948	765	171,979	862	193,785	529	118,924	607	136,459	684	153,769
	32		1.46	4.43	2.98	678	152,420	777	174,677	876	196,933	538	120,947	616	138,482	695	156,242
	33		1.50	4.71	3.16	721	162,087	826	185,692	931	209,297	572	128,591	655	147,250	739	166,134
	34		1.55	5.00	3.36	765	171,979	877	197,157	989	222,336	607	136,459	696	156,467	784	176,250
	35	1⅜	1.60	5.30	3.56	811	182,320	929	208,848	1,048	235,600	643	144,552	737	165,684	831	186,816
	36		1.64	5.61	3.77	858	192,886	983	220,987	1,108	249,088	681	153,095	780	175,351	879	197,607
	37		1.69	5.92	3.98	906	203,677	1,038	233,352	1,171	263,251	719	161,638	824	185,243	929	208,848
	38	1½	1.73	6.25	4.20	956	214,917	1,095	246,166	1,235	277,639	758	170,405	869	195,359	980	220,313
	39		1.78	6.58	4.42	1,007	226,383	1,154	259,430	1,301	292,476	799	179,622	915	205,700	1,032	232,003
	40		1.82	6.92	4.65	1,059	238,073	1,214	272,918	1,368	307,539	840	188,840	963	216,491	1,085	243,918
	41		1.87	7.27	4.89	1,113	250,212	1,275	286,631	1,437	323,050	883	198,506	1,012	227,507	1,140	256,282
	41.28	1⅝	1.88	7.37	4.95	1,128	253,584	1,292	290,453	1,457	327,547	895	201,204	1,025	230,429	1,156	259,879
	42		1.91	7.63	5.13	1,168	262,577	1,338	300,794	1,508	339,012	926	208,173	1,061	238,522	1,197	269,096

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1370		1570		1770		1370		1570		1770	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
18x7-IWRC	43		1.96	8.00	5.38	1,224	275,166	1,402	315,182	1,581	355,423	971	218,289	1,113	250,212	1,254	281,910
	44		2.01	8.38	5.63	1,281	287,980	1,468	330,020	1,655	372,059	1,017	228,631	1,165	261,902	1,313	295,174
	44.45	1¾	2.03	8.55	5.75	1,308	294,050	1,499	336,989	1,690	379,927	1,037	233,127	1,189	267,298	1,340	301,244
	45		2.05	8.76	5.89	1,340	301,244	1,536	345,307	1,732	389,369	1,063	238,972	1,219	274,042	1,374	308,887
	46		2.10	9.15	6.15	1,401	314,957	1,605	360,818	1,809	406,679	1,111	249,763	1,273	286,182	1,435	322,601
	47		2.14	9.56	6.42	1,462	328,671	1,675	376,555	1,889	424,664	1,160	260,778	1,329	298,771	1,499	336,989
	47.63	1⅞	2.17	9.81	6.59	1,502	337,663	1,721	386,896	1,940	436,129	1,191	267,747	1,365	306,864	1,539	345,981
	48		2.19	9.97	6.70	1,525	342,834	1,748	392,966	1,970	442,874	1,210	272,019	1,386	311,585	1,563	351,376
	49		2.23	10.39	6.98	1,589	357,221	1,821	409,377	2,053	461,533	1,261	283,484	1,445	324,849	1,629	366,214
	50		2.28	10.82	7.27	1,655	372,059	1,896	426,238	2,138	480,642	1,313	295,174	1,504	338,113	1,696	381,276
	50.8	2	2.32	11.16	7.50	1,708	383,974	1,957	439,951	2,207	496,153	1,355	304,616	1,553	349,128	1,751	393,640
	51		2.32	11.25	7.56	1,722	387,121	1,973	443,548	2,224	499,975	1,366	307,089	1,565	351,826	1,765	396,788
	52		2.37	11.70	7.86	1,790	402,408	2,051	461,083	2,312	519,758	1,420	319,229	1,627	365,764	1,834	412,300
	53		2.42	12.15	8.16	1,859	417,920	2,131	479,068	2,402	539,991	1,475	331,593	1,690	379,927	1,906	428,486
	54	2⅛	2.46	12.62	8.48	1,930	433,881	2,212	497,277	2,493	560,449	1,531	344,182	1,755	394,540	1,978	444,672
	55		2.51	13.09	8.80	2,002	450,068	2,294	515,712	2,587	581,581	1,588	356,997	1,820	409,152	2,052	461,308
	56		2.55	13.57	9.12	2,076	466,703	2,379	534,820	2,682	602,938	1,647	370,260	1,887	424,214	2,127	478,169
	57		2.60	14.06	9.45	2,150	483,339	2,464	553,929	2,778	624,519	1,706	383,524	1,955	439,501	2,204	495,479
	57.15	2¼	2.61	14.13	9.49	2,162	486,037	2,477	556,852	2,793	627,891	1,715	385,547	1,965	441,750	2,216	498,177
	58		2.64	14.55	9.78	2,227	500,650	2,552	573,712	2,877	646,775	1,766	397,013	2,024	455,013	2,282	513,014

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

IPERFLEX® H

18-strand rotation resistant balance rope for Koepe friction winders, featuring excellent flexibility, high bending fatigue performance, outstanding torque balance and increased rope weight.

FLEXIBILITY AND EXCELLENT ROTATIONAL STABILITY WITH INCREASED WEIGHT

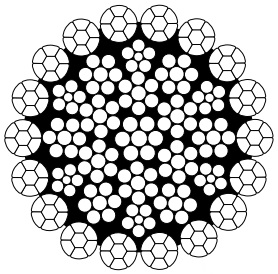
Specifications

- Lang lay or ordinary lay, right and left lay
- 30 – 58 mm: 18xK7-IWRC
- Conformity: EN 12385-6 (other standards available upon request)
- Use with rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✘ PLASTFILL®

Benefits

- Rotation resistant
- High breaking force
- High flexibility and bending fatigue performance
- Very low rope elongation
- Excellent radial stability
- "H" for increased rope weight due to compacted outer strands



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1370		1570		1770		1370		1570		1770	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
18xK7-IWRC	30		1.49	4.11	2.76	643	144,552	737	165,684	831	186,816	504	113,304	577	129,715	651	146,351
	31		1.54	4.39	2.95	687	154,444	787	176,925	887	199,406	538	120,947	616	138,482	695	156,242
	31.75	1¼	1.57	4.61	3.10	720	161,862	826	185,692	931	209,297	564	126,792	646	145,227	729	163,886
	32		1.59	4.68	3.14	732	164,560	839	188,615	946	212,669	573	128,816	657	147,699	740	166,359
	33		1.64	4.98	3.35	778	174,901	892	200,530	1,006	226,158	609	136,909	698	156,917	787	176,925
	34		1.69	5.29	3.55	826	185,692	947	212,894	1,067	239,871	647	145,451	741	166,583	836	187,940
	35	1⅜	1.74	5.60	3.76	876	196,933	1,003	225,483	1,131	254,259	685	153,994	785	176,475	886	199,181
	36		1.79	5.93	3.98	926	208,173	1,061	238,522	1,197	269,096	725	162,986	831	186,816	937	210,646
	37		1.84	6.26	4.21	978	219,863	1,121	252,011	1,264	284,159	766	172,204	878	197,382	990	222,561
	38	1½	1.88	6.60	4.43	1,032	232,003	1,183	265,949	1,333	299,670	808	181,646	926	208,173	1,044	234,701
	39		1.93	6.95	4.67	1,087	244,367	1,246	280,112	1,404	315,632	851	191,312	975	219,189	1,100	247,290
	40		1.98	7.32	4.92	1,144	257,181	1,310	294,500	1,477	332,043	895	201,204	1,026	230,654	1,157	260,104
	41		2.03	7.69	5.17	1,201	269,996	1,377	309,562	1,552	348,903	941	211,545	1,078	242,344	1,215	273,143
	41.28	1⅝	2.05	7.79	5.23	1,218	273,817	1,396	313,833	1,573	353,624	953	214,243	1,093	245,716	1,232	276,965
	42		2.08	8.07	5.42	1,261	283,484	1,445	324,849	1,629	366,214	987	221,886	1,131	254,259	1,275	286,631

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1370		1570		1770		1370		1570		1770	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
18xK7-IWRC	43		2.13	8.45	5.68	1,322	297,197	1,514	340,361	1,707	383,749	1,035	232,677	1,186	266,623	1,337	300,570
	44		2.18	8.85	5.95	1,384	311,136	1,586	356,547	1,788	401,958	1,083	243,468	1,241	278,988	1,399	314,508
	44.45	1¾	2.20	9.03	6.07	1,412	317,430	1,618	363,741	1,824	410,052	1,105	248,414	1,267	284,833	1,428	321,027
	45		2.23	9.26	6.22	1,447	325,299	1,659	372,958	1,870	420,393	1,133	254,709	1,298	291,802	1,464	329,120
	46		2.28	9.67	6.50	1,512	339,911	1,733	389,594	1,954	439,277	1,184	266,174	1,357	305,066	1,530	343,958
	47		2.33	10.10	6.79	1,579	354,973	1,809	406,679	2,040	458,610	1,236	277,864	1,416	318,329	1,597	359,020
	47.63	1⅞	2.36	10.37	6.97	1,621	364,415	1,858	417,695	2,095	470,975	1,269	285,283	1,455	327,097	1,640	368,687
	48		2.38	10.53	7.08	1,647	370,260	1,887	424,214	2,127	478,169	1,289	289,779	1,477	332,043	1,666	374,532
	49		2.43	10.98	7.38	1,716	385,772	1,967	442,199	2,217	498,401	1,343	301,918	1,540	346,206	1,736	390,268
	50		2.48	11.43	7.68	1,787	401,734	2,048	460,409	2,308	518,859	1,399	314,508	1,603	360,369	1,807	406,230
	50.8	2	2.52	11.80	7.93	1,844	414,548	2,114	475,246	2,383	535,720	1,444	324,624	1,655	372,059	1,865	419,269
	51		2.53	11.89	7.99	1,859	417,920	2,130	478,843	2,402	539,991	1,455	327,097	1,668	374,981	1,880	422,641
	52		2.58	12.36	8.31	1,933	434,556	2,215	497,952	2,497	561,348	1,513	340,136	1,734	389,819	1,955	439,501
	53		2.63	12.84	8.63	2,008	451,416	2,301	517,285	2,594	583,154	1,572	353,400	1,801	404,881	2,031	456,587
	54	2⅛	2.68	13.33	8.96	2,084	468,502	2,388	536,844	2,693	605,410	1,632	366,888	1,870	420,393	2,108	473,897
	55		2.73	13.83	9.29	2,162	486,037	2,478	557,077	2,793	627,891	1,693	380,602	1,940	436,129	2,187	491,657
	56		2.78	14.34	9.64	2,241	503,797	2,569	577,534	2,896	651,047	1,755	394,540	2,011	452,091	2,267	509,642
	57		2.83	14.85	9.98	2,322	522,006	2,661	598,217	3,000	674,427	1,818	408,703	2,083	468,277	2,349	528,076
	57.15	2¼	2.83	14.93	10.03	2,334	524,704	2,675	601,364	3,016	678,024	1,827	410,726	2,094	470,750	2,361	530,774
	58		2.88	15.38	10.33	2,404	540,441	2,755	619,349	3,106	698,257	1,882	423,090	2,157	484,913	2,432	546,735

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

IPERFLEX® L

18-strand rotation resistant balance rope for Koepe friction winders, featuring excellent flexibility, high bending fatigue performance, outstanding torque balance and reduced rope weight.

FLEXIBILITY AND EXCELLENT ROTATIONAL STABILITY WITH REDUCED WEIGHT

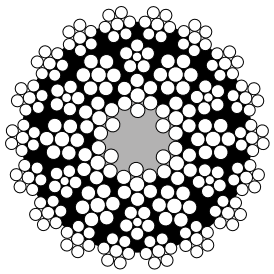
Specifications

- Lang lay or ordinary lay, right and left lay
- 30 – 58 mm: 18x7-IWRC-SFC
- Conformity: EN 12385-6 (other standards available upon request)
- Use with rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✘ SUPERFILL®
✘ PLASTFILL®

Benefits

- Rotation resistant
- Good breaking force
- High flexibility and bending fatigue performance
- Low rope elongation
- Excellent radial stability
- "L" for reduced rope weight due to a synthetic fiber strand as center strand



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1370		1570		1770		1370		1570		1770	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
18x7-IWRC-SFC	30		1.37	3.74	2.51	565	127,017	648	145,676	730	164,111	460	103,412	527	118,474	594	133,537
	31		1.41	3.99	2.68	604	135,785	692	155,568	780	175,351	491	110,381	563	126,567	635	142,754
	31.75	1¼	1.45	4.19	2.82	633	142,304	726	163,211	818	183,894	515	115,777	590	132,637	666	149,723
	32		1.46	4.26	2.86	643	144,552	737	165,684	831	186,816	523	117,575	600	134,885	676	151,971
	33		1.50	4.53	3.04	684	153,769	784	176,250	884	198,731	557	125,219	638	143,428	719	161,638
	34		1.55	4.81	3.23	726	163,211	832	187,041	938	210,871	591	132,862	677	152,196	763	171,529
	35	1⅜	1.60	5.09	3.42	770	173,103	882	198,281	994	223,460	626	140,730	717	161,188	809	181,870
	36		1.64	5.39	3.62	814	182,994	933	209,747	1,052	236,499	662	148,824	759	170,630	856	192,436
	37		1.69	5.69	3.82	860	193,336	986	221,662	1,111	249,763	700	157,366	802	180,297	904	203,227
	38	1½	1.73	6.00	4.03	907	203,902	1,040	233,801	1,172	263,476	738	165,909	846	190,188	954	214,468
	39		1.78	6.32	4.25	956	214,917	1,095	246,166	1,235	277,639	777	174,677	891	200,305	1,004	225,708
	40		1.82	6.65	4.47	1,005	225,933	1,152	258,980	1,299	292,027	818	183,894	937	210,646	1,057	237,623
	41		1.87	6.99	4.70	1,056	237,398	1,210	272,019	1,364	306,639	859	193,111	985	221,437	1,110	249,538
	41.28	1⅝	1.88	7.08	4.76	1,071	240,770	1,227	275,841	1,383	310,911	871	195,809	998	224,359	1,125	252,910
	42		1.91	7.33	4.93	1,108	249,088	1,270	285,507	1,432	321,926	902	202,778	1,033	232,228	1,165	261,902

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1370		1570		1770		1370		1570		1770	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
18x7-IWRC-SFC	43		1.96	7.69	5.17	1,162	261,228	1,331	299,221	1,501	337,438	945	212,444	1,083	243,468	1,221	274,492
	44		2.01	8.05	5.41	1,216	273,368	1,394	313,384	1,571	353,175	989	222,336	1,134	254,933	1,278	287,306
	44.45	1¾	2.03	8.21	5.52	1,241	278,988	1,422	319,678	1,604	360,594	1,010	227,057	1,157	260,104	1,305	293,376
	45		2.05	8.42	5.66	1,272	285,957	1,458	327,771	1,644	369,586	1,035	232,677	1,186	266,623	1,337	300,570
	46		2.10	8.80	5.91	1,329	298,771	1,523	342,384	1,717	385,997	1,081	243,018	1,239	278,538	1,397	314,058
	47		2.14	9.18	6.17	1,388	312,035	1,590	357,446	1,793	403,082	1,129	253,809	1,294	290,903	1,459	327,996
	47.63	1⅞	2.17	9.43	6.34	1,425	320,353	1,633	367,113	1,841	413,873	1,159	260,554	1,329	298,771	1,498	336,764
	48		2.19	9.58	6.44	1,447	325,299	1,659	372,958	1,870	420,393	1,178	264,825	1,349	303,267	1,521	341,934
	49		2.23	9.98	6.71	1,508	339,012	1,729	388,695	1,949	438,153	1,227	275,841	1,406	316,081	1,585	356,322
	50		2.28	10.39	6.98	1,571	353,175	1,800	404,656	2,029	456,137	1,278	287,306	1,464	329,120	1,651	371,160
	50.8	2	2.32	10.73	7.21	1,621	364,415	1,858	417,695	2,095	470,975	1,319	296,523	1,512	339,911	1,704	383,074
	51		2.32	10.81	7.26	1,634	367,338	1,873	421,067	2,111	474,572	1,329	298,771	1,523	342,384	1,718	386,222
	52		2.37	11.24	7.55	1,699	381,950	1,947	437,703	2,195	493,456	1,382	310,686	1,584	356,097	1,786	401,509
	53		2.42	11.68	7.85	1,765	396,788	2,022	454,564	2,280	512,564	1,436	322,826	1,645	369,811	1,855	417,021
	54	2⅛	2.46	12.12	8.14	1,832	411,850	2,099	471,874	2,367	532,123	1,490	334,965	1,708	383,974	1,926	432,982
	55		2.51	12.57	8.45	1,900	427,137	2,178	489,634	2,455	551,906	1,546	347,555	1,772	398,361	1,997	448,943
	56		2.55	13.04	8.76	1,970	442,874	2,258	507,619	2,545	572,139	1,603	360,369	1,837	412,974	2,071	465,579
	57		2.60	13.51	9.08	2,041	458,835	2,339	525,828	2,637	592,821	1,661	373,408	1,903	427,811	2,145	482,215
	57.15	2¼	2.61	13.58	9.13	2,052	461,308	2,351	528,526	2,651	595,969	1,669	375,206	1,913	430,060	2,157	484,913
	58		2.64	13.98	9.39	2,113	475,021	2,422	544,487	2,730	613,728	1,719	386,447	1,970	442,874	2,221	499,301

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

FLEXGUIDE HLC

Rotation resistant half-locked coil premium high performance guide rope. Our half-locked coil guide ropes are optimized to ensure a long service life, easier handling during installation, and reduced maintenance.

THE ROBUST DURABLE GUIDE ROPE SOLUTION

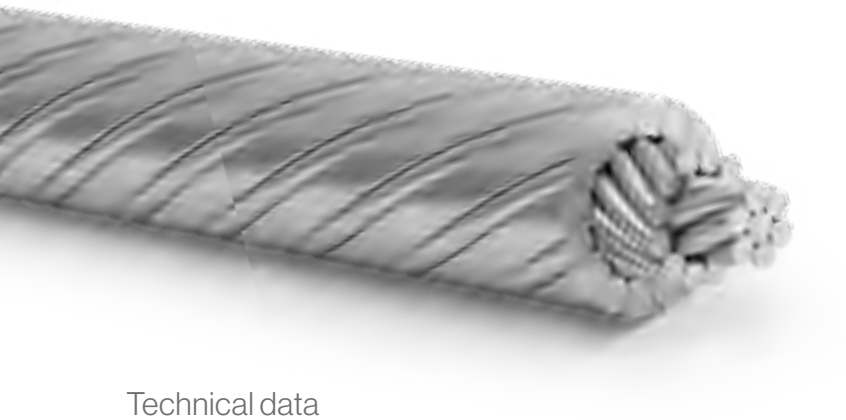
Specifications

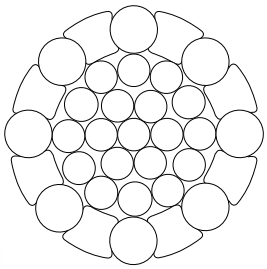
- Right or left lay
- 31.75 – 56 mm
- Conformity: EN 12385-7 (other standards available upon request)
- Rope finish: bright, galvanized, ZnAl

✘ SUPERFILL®
✘ PLASTFILL®

Benefits

- Rotation resistant
- High breaking force
- High resistance to wear
- Optimized round and shaped wires for long service life
- Very low rope elongation
- Excellent radial stability





Technical data

Constr.	Nominal Ø		Shaped wire height	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1180		1270		**1470/1270		1180		1270		**1470/1270	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
1 - 6 - 7/7X	31.75	1 1/4	6.50	5.37	3.61	779	175,126	839	188,615	882	198,281	717	161,188	772	173,553	812	182,545
	32		6.50	5.51	3.70	802	180,297	863	194,010	908	204,127	738	165,909	794	178,498	836	187,940
	33		6.50	5.83	3.92	846	190,188	910	204,576	959	215,592	778	174,901	837	188,165	883	198,506
	34		7.00	6.20	4.17	899	202,103	968	217,615	1,017	228,631	827	185,917	890	200,080	936	210,421
	35	1 3/8	7.00	6.64	4.46	965	216,941	1,039	233,576	1,094	245,941	888	199,630	956	214,917	1,006	226,158
1 - 6 - 12 - 8/8X	36		6.50	6.86	4.61	994	223,460	1,070	240,546	1,134	254,933	914	205,475	984	221,212	1,043	234,476
	37		6.50	7.24	4.87	1,047	235,375	1,126	253,135	1,196	268,871	963	216,491	1,036	232,902	1,100	247,290
	38	1 1/2	7.00	7.63	5.13	1,106	248,639	1,190	267,523	1,260	283,259	1,017	228,631	1,095	246,166	1,159	260,554
	39		7.00	8.03	5.40	1,161	261,003	1,249	280,786	1,325	297,872	1,068	240,096	1,149	258,305	1,219	274,042
	40		7.00	8.44	5.67	1,219	274,042	1,312	294,949	1,394	313,384	1,121	252,011	1,207	271,344	1,282	288,205
	41	1 5/8	7.60	8.93	6.00	1,297	291,577	1,396	313,833	1,477	332,043	1,193	268,197	1,284	288,655	1,359	305,515
	42		7.60	9.35	6.28	1,355	304,616	1,458	327,771	1,545	347,330	1,246	280,112	1,341	301,469	1,421	319,454
	43		7.60	9.82	6.60	1,419	319,004	1,527	343,283	1,621	364,415	1,306	293,600	1,405	315,857	1,491	335,190
	44		8.00	10.14	6.81	1,466	329,570	1,577	354,524	1,672	375,881	1,348	303,042	1,451	326,198	1,539	345,981
	44.45	1 3/4	8.00	10.44	7.02	1,511	339,686	1,626	365,539	1,724	387,571	1,390	312,484	1,496	336,314	1,586	356,547
	45		8.00	10.79	7.25	1,562	351,152	1,681	377,904	1,783	400,834	1,437	323,050	1,546	347,555	1,640	368,687

Constr.	Nominal Ø		Shaped wire height	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1180		1270		**1470/1270		1180		1270		**1470/1270	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
1 - 6 - 12 - 9/9X	46		7.60	11.03	7.41	1,597	359,020	1,719	386,447	1,833	412,075	1,469	330,244	1,581	355,423	1,687	379,253
	47		7.60	11.55	7.76	1,668	374,981	1,795	403,532	1,918	431,184	1,535	345,082	1,652	371,384	1,764	396,563
	47.63	1 7/8	7.60	11.91	8.00	1,725	387,795	1,856	417,245	1,983	445,796	1,587	356,772	1,708	383,974	1,824	410,052
	48		8.00	12.08	8.12	1,754	394,315	1,888	424,439	2,012	452,316	1,614	362,842	1,737	390,493	1,851	416,121
	49		8.00	12.43	8.35	1,796	403,757	1,933	434,556	2,064	464,006	1,652	371,384	1,778	399,710	1,899	426,912
	50		8.00	13.15	8.84	1,906	428,486	2,051	461,083	2,191	492,556	1,753	394,090	1,887	424,214	2,016	453,215
1 - 6 - 12 - 18 - 10/10X	50.8	2	7.60	13.30	8.94	1,921	431,858	2,067	464,680	2,219	498,851	1,748	392,966	1,881	422,866	2,020	454,114
	51		7.60	13.41	9.01	1,931	434,106	2,078	467,153	2,233	501,998	1,757	394,989	1,891	425,114	2,032	456,812
	52		7.60	13.96	9.38	2,011	452,091	2,165	486,711	2,327	523,130	1,830	411,400	1,970	442,874	2,118	476,145
	53		7.60	14.57	9.79	2,099	471,874	2,259	507,843	2,431	546,511	1,910	429,385	2,055	461,982	2,212	497,277
	54	2 1/8	8.00	14.98	10.07	2,158	485,138	2,322	522,006	2,496	561,123	1,964	441,525	2,113	475,021	2,272	510,766
	55		8.00	15.59	10.48	2,245	504,696	2,417	543,363	2,600	584,503	2,043	459,285	2,199	494,355	2,366	531,898
	56		8.00	16.24	10.91	2,339	525,828	2,518	566,069	2,710	609,232	2,129	478,618	2,291	515,037	2,466	554,379

* Actual rope weight = nominal rope weight -4% +4%. Shown nominal rope weight for fully lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.
**The first grade refers to inner wires, the second grade refers to outer-layer wires.

6MINE

The proven 6-strand rope which can replace conventional triangular strand ropes. Mainly used on Koepe friction winders and single-layer drum winders. The rope features compacted outer strands with Teufelberger-Redaelli SUPERFILL® compaction technology and our unique compound core.

COMPOUND CORE AND HIGH FLEXIBILITY

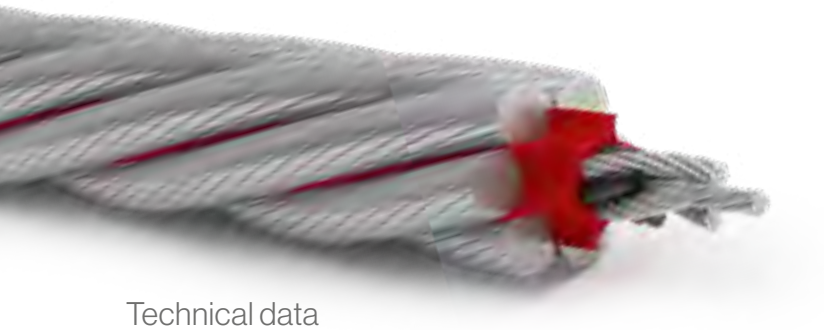
Specifications

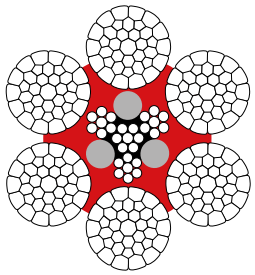
- Lang lay or ordinary lay, right and left lay
- 21 – 23 mm: 6xK19S-EPIWRC (compound)
- 24 – 32 mm: 6xK26WS-EPIWRC (compound)
- 33 – 38 mm: 6xK31WS-EPIWRC (compound)
- 39 – 65 mm: 6xK36WS-EPIWRC (compound)
- Conformity: EN 12385-6 (other standards available upon request)
- Use without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✔ PLASTFILL®

Benefits

- Non-rotation resistant rope (builds up significantly less torque than triangular strand ropes)
- Good breaking force
- Medium resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Medium rope elongation
- Good radial stability
- Good shock resistance





Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
6xK19S-EPIWRC	21		1.78	1.96	1.31	356	80,092	402	90,324	445	100,043	261	58,679	294	66,154	326	73,255
	22		1.86	2.15	1.44	391	87,923	441	99,153	489	109,820	286	64,401	323	72,604	358	80,398
	22.23	⅞	1.88	2.19	1.47	399	89,736	450	101,196	499	112,083	292	65,725	330	74,097	365	82,051
	23		1.94	2.35	1.58	428	96,119	482	108,392	534	120,052	313	70,388	353	79,355	391	87,873
6xK26WS-EPIWRC	24		1.90	2.45	1.65	446	100,208	503	113,002	557	125,156	341	76,642	384	86,405	426	95,680
	25		1.98	2.66	1.79	484	108,752	546	122,634	604	135,823	370	83,162	417	93,756	462	103,820
	25.4	1	2.01	2.74	1.84	499	112,267	563	126,597	624	140,211	382	85,844	430	96,780	477	107,169
	26		2.06	2.87	1.93	523	117,644	590	132,660	654	146,924	400	89,948	451	101,406	499	112,292
	27		2.14	3.10	2.08	564	126,886	636	143,078	705	158,461	431	97,000	486	109,357	539	121,096
	28		2.22	3.33	2.24	607	136,476	685	153,890	758	170,433	464	104,318	523	117,607	579	130,232
	28.58	1 ⅛	2.26	3.47	2.33	632	142,148	713	160,284	790	177,514	483	108,647	545	122,487	603	135,635
	29		2.29	3.58	2.40	651	146,414	734	165,094	813	182,841	498	111,903	561	126,158	621	139,700
	30		2.37	3.83	2.57	697	156,702	786	176,692	870	195,683	533	119,753	601	135,008	665	149,501
	31		2.45	4.09	2.75	744	167,338	839	188,683	930	208,962	569	127,870	641	144,159	710	159,634
	31.75	1 ¼	2.51	4.29	2.88	781	175,544	880	197,935	975	219,206	597	134,132	673	151,219	745	167,451
	32		2.53	4.35	2.93	793	178,323	894	201,068	991	222,675	606	136,252	683	153,609	757	170,099

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
6xK31WS-EPIWRC	33		2.25	4.73	3.18	861	193,581	971	218,269	1075	241,723	645	144,901	727	163,360	805	180,896
	34		2.32	5.02	3.37	914	205,504	1031	231,712	1141	256,609	684	153,816	771	173,411	854	192,025
	35	1 ⅜	2.39	5.32	3.57	969	217,784	1092	245,556	1210	271,939	725	162,997	817	183,761	905	203,487
	36		2.45	5.63	3.78	1025	230,420	1156	259,801	1280	287,714	767	172,445	865	194,412	958	215,281
	37		2.52	5.94	3.99	1083	243,411	1221	274,448	1352	303,932	810	182,158	913	205,363	1012	227,407
	38	1 ½	2.59	6.27	4.21	1142	256,759	1288	289,496	1426	320,595	855	192,137	964	216,613	1067	239,866
6xK36WS-EPIWRC	39		2.30	6.45	4.34	1175	264,138	1325	297,814	1467	329,807	900	202,383	1015	228,164	1124	252,656
	40		2.36	6.79	4.56	1236	277,869	1394	313,294	1543	346,949	947	212,894	1068	240,015	1182	265,779
	41		2.41	7.13	4.79	1299	291,947	1464	329,166	1621	364,525	995	223,672	1122	252,166	1242	279,234
	41.28	1 ⅝	2.43	7.23	4.86	1316	295,880	1484	333,600	1643	369,434	1008	226,683	1137	255,560	1259	282,993
	42		2.47	7.48	5.03	1363	306,373	1537	345,430	1702	382,534	1044	234,716	1177	264,616	1303	293,021
	43		2.53	7.84	5.27	1429	321,147	1611	362,086	1784	400,978	1094	246,026	1234	277,367	1366	307,141
	44		2.59	8.21	5.52	1496	336,268	1686	379,134	1868	419,856	1146	257,602	1292	290,418	1431	321,593
	44.45	1 ¾	2.62	8.38	5.63	1527	343,186	1721	386,933	1906	428,492	1169	262,898	1318	296,389	1460	328,204
	45		2.65	8.59	5.77	1565	351,737	1764	396,573	1954	439,167	1199	269,445	1351	303,769	1496	336,377
	46		2.71	8.98	6.03	1635	367,554	1843	414,404	2041	458,913	1252	281,553	1412	317,420	1564	351,493
	47		2.77	9.37	6.30	1707	383,718	1924	432,628	2131	479,092	1307	293,927	1474	331,370	1632	366,941
	47.63	1 ⅞	2.80	9.62	6.47	1753	393,997	1976	444,216	2188	491,925	1342	301,797	1513	340,242	1676	376,765
	48		2.83	9.77	6.57	1780	400,230	2007	451,243	2223	499,706	1364	306,568	1537	345,621	1702	382,722
	49		2.89	10.19	6.84	1855	417,089	2092	470,250	2316	520,753	1421	319,475	1602	360,172	1774	398,835
	50		2.94	10.61	7.13	1932	434,296	2178	489,649	2412	542,234	1480	332,648	1668	375,023	1847	415,280
	50.8	2	2.99	10.95	7.36	1994	448,312	2248	505,450	2490	559,732	1527	343,377	1722	387,120	1907	428,675
	51		3.00	11.03	7.42	2010	451,851	2266	509,440	2509	564,150	1539	346,087	1736	390,174	1922	432,057
	52		3.06	11.47	7.71	2090	469,753	2356	529,623	2609	586,499	1600	359,792	1804	405,625	1998	449,167
	53		3.12	11.92	8.01	2171	488,003	2447	550,197	2710	609,282	1663	373,763	1874	421,376	2076	466,608
	54	2 ⅛	3.18	12.37	8.31	2253	506,600	2541	571,164	2813	632,500	1726	388,000	1946	437,427	2155	484,382
	55		3.24	12.83	8.62	2338	525,545	2636	592,523	2919	656,151	1790	402,504	2019	453,778	2235	502,489
	56		3.30	13.30	8.94	2424	544,838	2732	614,273	3026	680,236	1856	417,273	2093	470,429	2317	520,927
	57		3.36	13.78	9.26	2511	564,479	2831	636,415	3135	704,755	1923	432,309	2168	487,380	2401	539,698
	57.15	2 ¼	3.37	13.86	9.31	2524	567,455	2846	639,770	3151	708,470	1933	434,587	2179	489,949	2413	542,542
	58		3.42	14.27	9.59	2600	584,467	2931	658,949	3246	729,708	1991	447,611	2245	504,631	2486	558,800
	59		3.47	14.77	9.92	2690	604,802	3033	681,876	3359	755,095	2060	463,178	2323	522,182	2572	578,236
	60		3.53	15.27	10.26	2782	625,485	3137	705,194	3474	780,916	2131	479,013	2402	540,033	2660	598,003
	60.33	2 ⅜	3.55	15.44	10.37	2813	632,282	3171	712,856	3511	789,402	2154	484,216	2428	545,899	2689	604,499
	61		3.59	15.79	10.61	2876	646,516	3242	728,903	3590	807,171	2202	495,113	2483	558,184	2749	618,102
	62		3.65	16.31	10.96	2971	667,895	3350	753,005	3709	833,860	2275	511,479	2565	576,635	2840	638,534
	63		3.71	16.84	11.31	3068	689,621	3458	777,499	3830	860,983	2349	528,111	2648	595,387	2933	659,298
	63.5	2 ½	3.74	17.11	11.50	3116	700,614	3514	789,893	3891	874,708	2387	536,527	2691	604,875	2979	669,805
	64		3.77	17.38	11.68	3166	711,694	3569	802,385	3952	888,540	2424	545,010	2733	614,438	3027	680,394
	65		3.83	17.92	12.04	3266	734,116	3682	827,662	4077	916,531	2501	562,174	2819	633,789	3122	701,823

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for strand lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

RED 1T

Premium reliable 6-strand rope with non-compacted outer strands and a synthetic fiber core. Mainly used on Koepe friction winders and single-layer drum winders.

NON-COMPACTED & LIGHTWEIGHT

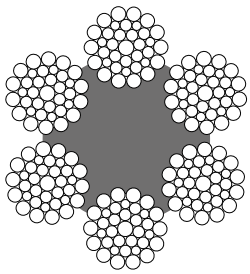
Specifications

- Lang lay or ordinary lay, right and left lay
- 20 – 26 mm: 6x19S-SFC
- 27 – 30 mm: 6x31WS-SFC
- 31 – 60 mm: 6x36WS-SFC
- Conformity: EN 12385-6 (other standards available upon request)
- Use without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✘ SUPERFILL®
✘ PLASTFILL®

Benefits

- Non-rotation resistant rope
- Medium breaking force
- High flexibility and bending fatigue performance
- Medium rope elongation
- Medium radial stability
- Good shock resistance



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
6x19S-SFC	20		1.60	1.43	0.96	248	55,753	279	62,722	309	69,466	217	48,784	245	55,078	271	60,923
	21		1.68	1.58	1.06	273	61,373	308	69,241	341	76,660	239	53,729	270	60,698	299	67,218
	22		1.76	1.73	1.16	300	67,443	338	75,985	374	84,079	263	59,125	296	66,543	328	73,737
	22.23	7/8	1.77	1.77	1.19	306	68,792	345	77,559	382	85,877	268	60,249	302	67,892	335	75,311
	23		1.83	1.89	1.27	328	73,737	369	82,955	409	91,947	287	64,520	324	72,838	358	80,482
	24		1.91	2.06	1.38	357	80,257	402	90,373	445	100,040	313	70,365	352	79,133	390	87,675
	25		1.99	2.24	1.51	387	87,001	436	98,017	483	108,583	339	76,210	382	85,877	423	95,094
	25.4	1	2.03	2.31	1.55	399	89,699	450	101,164	499	112,180	350	78,683	395	88,800	437	98,242
	26		2.07	2.42	1.63	419	94,195	472	106,110	522	117,350	367	82,505	413	92,846	458	102,962
6x31WS-SFC	27		1.72	2.66	1.79	461	103,637	519	116,676	575	129,265	396	89,024	446	100,265	494	111,056
	28		1.78	2.86	1.92	496	111,505	559	125,668	619	139,157	425	95,544	480	107,908	531	119,374
	28.58	1 1/8	1.82	2.98	2.00	516	116,001	582	130,839	645	145,002	443	99,590	500	112,404	553	124,319
	29		1.85	3.07	2.06	532	119,598	599	134,661	664	149,273	456	102,513	514	115,552	570	128,141
	30		1.91	3.28	2.20	569	127,916	641	144,103	710	159,614	488	109,707	551	123,870	610	137,133

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
6x36WS-SFC	31		1.75	3.56	2.39	617	138,707	696	156,467	770	173,103	533	119,823	601	135,110	666	149,723
	31.75	1 1/4	1.79	3.73	2.51	647	145,451	730	164,111	808	181,646	559	125,668	631	141,854	698	156,917
	32		1.81	3.79	2.55	657	147,699	741	166,583	821	184,568	568	127,691	641	144,103	709	159,390
	33		1.86	4.03	2.71	699	157,141	788	177,149	873	196,258	604	135,785	681	153,095	754	169,506
	34		1.92	4.28	2.88	742	166,808	837	188,165	927	208,398	641	144,103	723	162,537	801	180,072
	35	1 3/8	1.98	4.53	3.04	786	176,700	887	199,406	982	220,762	680	152,870	766	172,204	849	190,863
	36		2.03	4.80	3.23	832	187,041	938	210,871	1,039	233,576	719	161,638	811	182,320	898	201,878
	37		2.09	5.07	3.41	879	197,607	991	222,786	1,097	246,615	760	170,855	856	192,436	948	213,119
	38	1 1/2	2.15	5.34	3.59	927	208,398	1,045	234,925	1,157	260,104	801	180,072	903	203,002	1,000	224,809
	39		2.20	5.63	3.78	977	219,638	1,101	247,515	1,219	274,042	844	189,739	951	213,793	1,054	236,949
	40		2.26	5.92	3.98	1,027	230,879	1,158	260,329	1,282	288,205	888	199,630	1,001	225,034	1,108	249,088
	41		2.32	6.22	4.18	1,079	242,569	1,217	273,592	1,347	302,818	933	209,747	1,052	236,499	1,164	261,678
	41.28	1 5/8	2.33	6.31	4.24	1,094	245,941	1,233	277,189	1,366	307,089	946	212,669	1,066	239,646	1,180	265,275
	42		2.37	6.53	4.39	1,133	254,709	1,277	287,081	1,414	317,880	979	220,088	1,104	248,189	1,222	274,717
	43		2.43	6.84	4.60	1,187	266,848	1,338	300,794	1,482	333,167	1,026	230,654	1,157	260,104	1,281	287,980
	44		2.49	7.17	4.82	1,243	279,438	1,401	314,957	1,552	348,903	1,074	241,445	1,211	272,244	1,341	301,469
	44.45	1 3/4	2.51	7.31	4.91	1,269	285,283	1,430	321,477	1,584	356,097	1,096	246,391	1,236	277,864	1,369	307,763
	45		2.54	7.50	5.04	1,300	292,252	1,466	329,570	1,623	364,865	1,124	252,685	1,267	284,833	1,403	315,407
	46		2.60	7.83	5.26	1,359	305,515	1,532	344,407	1,696	381,276	1,174	263,926	1,324	297,647	1,466	329,570
	47		2.65	8.18	5.50	1,418	318,779	1,599	359,470	1,771	398,137	1,226	275,616	1,382	310,686	1,530	343,958
	47.63	1 7/8	2.69	8.40	5.64	1,457	327,547	1,642	369,136	1,818	408,703	1,259	283,034	1,419	319,004	1,572	353,400
	48		2.71	8.53	5.73	1,479	332,492	1,668	374,981	1,847	415,222	1,278	287,306	1,441	323,950	1,596	358,795
	49		2.77	8.89	5.97	1,542	346,655	1,738	390,718	1,924	432,532	1,332	299,446	1,502	337,663	1,663	373,857
	50		2.82	9.25	6.22	1,605	360,818	1,810	406,904	2,004	450,517	1,387	311,810	1,564	351,601	1,732	389,369
	50.8	2	2.87	9.55	6.42	1,657	372,508	1,868	419,943	2,068	464,905	1,432	321,926	1,614	362,842	1,788	401,958
	51		2.88	9.63	6.47	1,670	375,431	1,883	423,315	2,085	468,727	1,443	324,399	1,627	365,764	1,802	405,106
	52		2.94	10.01	6.73	1,736	390,268	1,957	439,951	2,167	487,161	1,500	337,213	1,692	380,377	1,873	421,067
	53		2.99	10.40	6.99	1,803	405,331	2,033	457,037	2,251	506,045	1,559	350,477	1,757	394,989	1,946	437,478
	54	2 1/8	3.05	10.79	7.25	1,872	420,842	2,111	474,572	2,337	525,379	1,618	363,741	1,824	410,052	2,020	454,114
	55		3.11	11.20	7.53	1,942	436,579	2,190	492,332	2,425	545,162	1,679	377,454	1,892	425,339	2,095	470,975
	56		3.16	11.61	7.80	2,013	452,540	2,270	510,316	2,514	565,170	1,740	391,168	1,962	441,075	2,172	488,285
	57		3.22	12.03	8.08	2,086	468,951	2,352	528,751	2,604	585,402	1,803	405,331	2,032	456,812	2,251	506,045
	57.15	2 1/4	3.23	12.09	8.12	2,097	471,424	2,364	531,448	2,618	588,550	1,812	407,354	2,043	459,285	2,263	508,743
	58		3.28	12.45	8.37	2,160	485,587	2,435	547,410	2,696	606,085	1,867	419,718	2,104	472,998	2,330	523,805
	59		3.33	12.88	8.65	2,235	502,448	2,520	566,519	2,790	627,217	1,932	434,331	2,178	489,634	2,411	542,014
	60		3.39	13.33	8.96	2,311	519,533	2,606	585,852	2,885	648,574	1,998	449,168	2,252	506,270	2,494	560,674

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for strand lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

PACK® 1T

Premium reliable 6-strand rope consisting of compacted outer strands with Teufelberger-Redaelli SUPERFILL® compaction technology and a synthetic fiber core. Mainly used on Koepe friction winders and single-layer drum winders.

COMPACTED & LIGHTWEIGHT

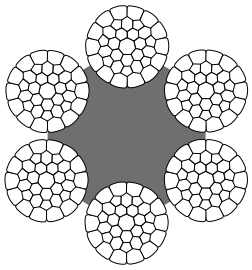
Specifications

- Lang lay or ordinary lay, right and left lay
- 20 – 23 mm: 6xK19S-SFC
- 24 – 30 mm: 6xK31WS-SFC
- 31 – 60 mm: 6xK36WS-SFC
- Conformity: EN 12385-6 (other standards available upon request)
- Use without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✘ PLASTFILL®

Benefits

- Non-rotation resistant rope
- Good breaking force
- Medium resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Medium rope elongation
- Medium radial stability
- Good shock resistance



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
6xK19S-SFC	20		1.68	1.62	1.09	297	66,768	335	75,311	371	83,404	254	57,101	286	64,295	317	71,264
	21		1.76	1.79	1.20	328	73,737	370	83,179	409	91,947	280	62,947	316	71,040	350	78,683
	22		1.85	1.96	1.32	360	80,931	406	91,272	449	100,939	307	69,016	347	78,009	384	86,327
	22.23	7/8	1.87	2.00	1.34	367	82,505	414	93,071	459	103,187	314	70,590	354	79,582	392	88,125
	23		1.93	2.15	1.44	393	88,350	443	99,590	491	110,381	336	75,536	379	85,203	419	94,195
6xK31WS-SFC	24		1.62	2.30	1.55	416	93,521	469	105,435	519	116,676	362	81,381	408	91,722	452	101,614
	25		1.69	2.50	1.68	451	101,389	509	114,428	563	126,567	393	88,350	443	99,590	491	110,381
	25.4	1	1.71	2.58	1.73	466	104,761	525	118,025	582	130,839	406	91,272	457	102,738	507	113,978
	26		1.75	2.70	1.81	488	109,707	550	123,645	609	136,909	425	95,544	479	107,683	531	119,374
	27		1.82	2.91	1.96	526	118,250	593	133,312	657	147,699	458	102,962	517	116,226	572	128,591
	28		1.89	3.13	2.10	566	127,242	638	143,428	707	158,940	493	110,831	556	124,994	616	138,482
	28.58	1 1/8	1.93	3.27	2.20	590	132,637	665	149,498	736	165,459	514	115,552	579	130,164	641	144,103
	29		1.96	3.36	2.26	607	136,459	685	153,994	758	170,405	529	118,924	596	133,986	660	148,374
	30		2.02	3.60	2.42	650	146,126	733	164,785	811	182,320	566	127,242	638	143,428	707	158,940

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
6xK36WS-SFC	31		1.81	3.75	2.52	679	152,645	765	171,979	847	190,413	575	129,265	648	145,676	717	161,188
	31.75	1 1/4	1.85	3.93	2.64	712	160,064	803	180,522	889	199,855	603	135,560	680	152,870	753	169,281
	32		1.87	3.99	2.68	723	162,537	815	183,219	903	203,002	612	137,583	690	155,118	765	171,979
	33		1.93	4.24	2.85	769	172,878	867	194,909	960	215,817	651	146,351	734	165,010	813	182,770
	34		1.98	4.51	3.03	816	183,444	920	206,824	1,019	229,080	691	155,343	779	175,126	863	194,010
	35	1 3/8	2.04	4.77	3.21	865	194,460	975	219,189	1,080	242,794	733	164,785	826	185,692	915	205,700
	36		2.10	5.05	3.39	915	205,700	1,032	232,003	1,143	256,957	775	174,227	874	196,483	968	217,615
	37		2.16	5.34	3.59	967	217,390	1,090	245,042	1,207	271,344	819	184,119	923	207,499	1,022	229,755
	38	1 1/2	2.22	5.63	3.78	1,020	229,305	1,150	258,530	1,273	286,182	864	194,235	974	218,964	1,078	242,344
	39		2.28	5.93	3.98	1,074	241,445	1,211	272,244	1,341	301,469	910	204,576	1,025	230,429	1,136	255,383
	40		2.34	6.24	4.19	1,130	254,034	1,274	286,407	1,411	317,205	957	215,142	1,079	242,569	1,195	268,647
	41		2.39	6.55	4.40	1,187	266,848	1,338	300,794	1,482	333,167	1,005	225,933	1,133	254,709	1,255	282,135
	41.28	1 5/8	2.41	6.64	4.46	1,204	270,670	1,357	305,066	1,502	337,663	1,019	229,080	1,149	258,305	1,272	285,957
	42		2.45	6.88	4.62	1,246	280,112	1,405	315,857	1,555	349,578	1,055	237,173	1,189	267,298	1,317	296,073
	43		2.51	7.21	4.84	1,306	293,600	1,472	330,919	1,630	366,439	1,106	248,639	1,247	280,337	1,380	310,236
	44		2.57	7.55	5.07	1,367	307,314	1,542	346,655	1,707	383,749	1,158	260,329	1,305	293,376	1,445	324,849
	44.45	1 3/4	2.59	7.70	5.17	1,395	313,608	1,573	353,624	1,742	391,617	1,182	265,724	1,332	299,446	1,475	331,593
	45		2.63	7.89	5.30	1,430	321,477	1,612	362,392	1,785	401,284	1,211	272,244	1,365	306,864	1,512	339,911
	46		2.69	8.25	5.54	1,494	335,865	1,685	378,803	1,866	419,493	1,265	284,383	1,427	320,802	1,580	355,198
	47		2.74	8.61	5.79	1,560	350,702	1,759	395,439	1,948	437,928	1,321	296,973	1,489	334,741	1,649	370,710
	47.63	1 7/8	2.78	8.84	5.94	1,602	360,144	1,806	406,005	2,000	449,618	1,357	305,066	1,530	343,958	1,694	380,826
	48		2.80	8.98	6.03	1,627	365,764	1,835	412,524	2,031	456,587	1,378	309,787	1,553	349,128	1,720	386,671
	49		2.86	9.36	6.29	1,696	381,276	1,912	429,835	2,117	475,921	1,436	322,826	1,619	363,966	1,793	403,082
	50		2.92	9.74	6.54	1,766	397,013	1,991	447,595	2,204	495,479	1,495	336,089	1,686	379,028	1,866	419,493
	50.8	2	2.97	10.06	6.76	1,823	409,827	2,055	461,982	2,275	511,440	1,543	346,880	1,740	391,168	1,927	433,207
	51		2.98	10.14	6.81	1,837	412,974	2,071	465,579	2,293	515,487	1,556	349,803	1,754	394,315	1,942	436,579
	52		3.04	10.54	7.08	1,910	429,385	2,153	484,014	2,384	535,945	1,617	363,516	1,823	409,827	2,019	453,889
	53		3.09	10.95	7.36	1,984	446,021	2,237	502,898	2,477	556,852	1,680	377,679	1,894	425,788	2,097	471,424
	54	2 1/8	3.15	11.37	7.64	2,059	462,882	2,322	522,006	2,571	577,984	1,744	392,067	1,966	441,974	2,177	489,409
	55		3.21	11.79	7.92	2,136	480,192	2,409	541,565	2,667	599,565	1,809	406,679	2,040	458,610	2,258	507,619
	56		3.27	12.22	8.21	2,215	497,952	2,497	561,348	2,765	621,597	1,875	421,517	2,114	475,246	2,341	526,278
	57		3.33	12.66	8.51	2,295	515,937	2,587	581,581	2,865	644,078	1,943	436,804	2,191	492,556	2,426	545,386
	57.15	2 1/4	3.34	12.73	8.55	2,307	518,634	2,601	584,728	2,880	647,450	1,953	439,052	2,202	495,029	2,438	548,084
	58		3.39	13.11	8.81	2,376	534,146	2,679	602,263	2,966	666,783	2,012	452,316	2,268	509,867	2,512	564,720
	59		3.44	13.57	9.12	2,459	552,805	2,772	623,170	3,069	689,939	2,082	468,052	2,347	527,627	2,599	584,278
	60		3.50	14.03	9.43	2,543	571,689	2,866	644,302	3,174	713,544	2,153	484,014	2,427	545,611	2,688	604,286

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for strand lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

RED 1

Premium reliable 6-strand rope with non-compacted outer strands and a non-compacted independent wire rope core. Mainly used on Koepe friction winders and single-layer drum winders.

FIT FOR PURPOSE

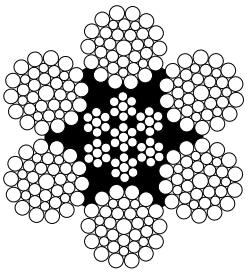
Specifications

- Lang lay or ordinary lay, right and left lay
- 19 – 26 mm: 6x19S-IWRC
- 27 – 32 mm: 6x26WS-IWRC
- 33 – 38 mm: 6x31WS-IWRC
- 39 – 65 mm: 6x36WS-IWRC
- Conformity: EN 12385-6 (other standards available upon request)
- Use without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✘ SUPERFILL®
✘ PLASTFILL®

Benefits

- Non-rotation resistant rope
- Good breaking force
- Medium resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Low rope elongation
- Good radial stability



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
6x19S-IWRC	19		1.53	1.46	0.98	269	60,419	303	68,144	336	75,483	218	49,035	246	55,282	272	61,216
	19.05	¾	1.54	1.47	0.99	270	60,738	305	68,504	338	75,882	219	49,293	247	55,573	274	61,538
	20		1.61	1.62	1.09	298	66,970	336	75,530	372	83,662	242	54,332	272	61,254	302	67,829
	21		1.69	1.79	1.20	329	73,857	371	83,295	410	92,260	266	59,902	300	67,532	333	74,782
	22		1.77	1.96	1.32	361	81,081	407	91,438	451	101,278	292	65,742	330	74,117	365	82,073
	22.23	⅞	1.79	2.00	1.35	368	82,752	415	93,323	460	103,365	298	67,094	336	75,641	373	83,760
	23		1.85	2.15	1.44	394	88,640	445	99,961	492	110,715	320	71,855	360	81,008	399	89,704
	24		1.94	2.34	1.57	429	96,536	484	108,862	536	120,572	348	78,239	392	88,205	434	97,674
	25		2.02	2.54	1.70	466	104,767	526	118,142	582	130,848	378	84,894	426	95,709	471	105,983
	25.4	1	2.05	2.62	1.76	481	108,154	543	121,960	601	135,076	390	87,633	439	98,796	487	109,401
	26		2.10	2.74	1.84	504	113,334	568	127,801	630	141,543	408	91,822	460	103,519	510	114,631
6x26WS-IWRC	27		2.01	2.98	2.00	547	123,046	617	138,749	684	153,667	440	99,021	497	111,635	550	123,618
	28		2.08	3.20	2.15	589	132,346	664	149,234	735	165,278	474	106,492	534	120,057	591	132,945
	28.58	1 ⅛	2.13	3.34	2.24	613	137,847	691	155,436	766	172,145	493	110,910	556	125,039	616	138,461
	29		2.16	3.44	2.31	632	141,985	712	160,101	789	177,311	508	114,234	573	128,786	634	142,611

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
6x26WS-IWRC	30		2.23	3.68	2.47	676	151,961	762	171,348	844	189,766	544	122,248	613	137,821	679	152,615
	31		2.31	3.93	2.64	722	162,276	814	182,977	901	202,643	581	130,534	655	147,162	725	162,959
	31.75	1 ¼	2.36	4.12	2.77	757	170,234	854	191,949	946	212,578	609	136,926	687	154,369	760	170,940
	32		2.38	4.18	2.81	769	172,929	867	194,987	961	215,942	619	139,091	698	156,810	772	173,642
6x31WS-IWRC	33		2.13	4.51	3.03	829	186,336	935	210,101	1035	232,679	658	147,920	742	166,763	821	184,665
	34		2.19	4.79	3.22	880	197,814	992	223,041	1099	247,008	698	157,021	787	177,023	872	196,026
	35	1 ⅜	2.26	5.07	3.41	932	209,634	1051	236,368	1164	261,765	740	166,393	834	187,590	924	207,726
	36		2.32	5.37	3.61	987	221,797	1112	250,081	1232	276,950	783	176,037	883	198,462	978	219,766
	37		2.38	5.67	3.81	1042	234,303	1175	264,180	1301	292,562	827	185,953	933	209,641	1033	232,145
	38	1 ½	2.45	5.98	4.02	1099	247,152	1240	278,665	1373	308,602	872	196,140	984	221,126	1089	244,863
6x36WS-IWRC	39		2.23	6.37	4.28	1171	263,294	1321	296,864	1462	328,755	919	206,599	1036	232,917	1147	257,920
	40		2.29	6.70	4.50	1232	276,982	1389	312,294	1538	345,842	967	217,330	1090	245,015	1207	271,316
	41		2.34	7.04	4.73	1294	291,015	1460	328,116	1616	363,361	1016	228,332	1145	257,419	1268	285,051
	41.28	1 ⅝	2.36	7.14	4.80	1312	294,935	1479	332,535	1638	368,255	1029	231,405	1160	260,884	1285	288,888
	42		2.40	7.39	4.97	1358	305,395	1532	344,328	1696	381,313	1066	239,606	1202	270,129	1331	299,126
	43		2.46	7.75	5.21	1424	320,122	1605	360,930	1778	399,698	1117	251,152	1259	283,146	1395	313,540
	44		2.51	8.11	5.45	1491	335,195	1681	377,923	1862	418,516	1170	262,969	1319	296,468	1460	328,293
	44.45	1 ¾	2.54	8.28	5.56	1522	342,091	1716	385,698	1900	427,125	1194	268,375	1346	302,563	1490	335,042
	45		2.57	8.48	5.70	1560	350,614	1758	395,307	1947	437,766	1224	275,058	1379	310,097	1527	343,384
	46		2.63	8.87	5.96	1630	366,381	1837	413,082	2035	457,448	1279	287,419	1441	324,032	1596	358,816
	47		2.69	9.26	6.22	1701	382,493	1918	431,247	2124	477,563	1335	300,051	1505	338,274	1666	374,586
	47,63	1 ⅞	2.72	9.50	6.39	1747	392,740	1970	442,799	2181	490,355	1370	308,084	1545	347,330	1711	384,614
	48		2.74	9.65	6.49	1775	398,952	2001	449,803	2216	498,111	1392	312,955	1569	352,822	1738	390,695
	49		2.80	10.06	6.76	1849	415,758	2085	468,749	2309	519,091	1451	326,130	1636	367,676	1811	407,144
	50		2.86	10.47	7.04	1926	432,910	2171	488,086	2404	540,504	1511	339,578	1703	382,836	1886	423,931
	50.8	2	2.90	10.81	7.27	1988	446,881	2241	503,837	2482	557,946	1559	350,531	1758	395,185	1947	437,606
	51		2.91	10.90	7.32	2004	450,409	2259	507,814	2501	562,350	1572	353,297	1772	398,303	1962	441,058
	52		2.97	11.33	7.61	2083	468,254	2348	527,933	2601	584,628	1634	367,287	1842	414,075	2040	458,524
	53		3.03	11.77	7.91	2164	486,446	2440	548,442	2702	607,338	1697	381,550	1913	430,155	2119	476,329
	54	2 ⅛	3.09	12.22	8.21	2246	504,984	2533	569,341	2805	630,481	1762	396,083	1986	446,540	2200	494,474
	55		3.14	12.67	8.52	2330	523,868	2627	590,632	2909	654,057	1828	410,889	2061	463,232	2282	512,957
	56		3.20	13.14	8.83	2416	543,100	2724	612,313	3016	678,065	1895	425,966	2136	480,230	2365	531,780
	57		3.26	13.61	9.15	2503	562,677	2822	634,385	3125	702,506	1963	441,315	2213	497,534	2451	550,941
	57.15	2 ¼	3.27	13.68	9.20	2516	565,644	2837	637,729	3141	706,210	1973	443,641	2225	500,156	2464	553,845
	58		3.31	14.09	9.47	2592	582,601	2922	656,847	3236	727,380	2033	456,936	2291	515,144	2537	570,442
	59		3.37	14.58	9.80	2682	602,872	3023	679,700	3348	752,686	2103	472,828	2371	533,061	2626	590,282
	60		3.43	15.08	10.14	2773	623,489	3127	702,943	3463	778,425	2175	488,992	2452	551,284	2715	610,461
	60.33	2 ⅜	3.45	15.25	10.25	2804	630,265	3161	710,582	3500	786,883	2199	494,304	2479	557,272	2745	617,093
	61		3.49	15.59	10.48	2867	644,453	3232	726,578	3579	804,596	2248	505,427	2535	569,813	2807	630,980
	62		3.54	16.11	10.82	2961	665,763	3339	750,603	3697	831,200	2323	522,135	2618	588,649	2900	651,837
	63		3.60	16.63	11.17	3058	687,420	3447	775,018	3818	858,236	2398	539,114	2704	607,791	2994	673,034
	63.5	2 ½	3.63	16.89	11.35	3107	698,378	3502	787,372	3878	871,917	2436	547,705	2747	617,476	3042	683,759
	64		3.66	17.16	11.53	3156	709,423	3558	799,824	3940	885,705	2475	556,364	2790	627,239	3090	694,569
	65		3.71	17.70	11.89	3255	731,773	3670	825,021	4064	913,607	2553	573,886	2878	646,993	3187	716,444

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for strand lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

PACK® 1

Premium reliable 6-strand rope consisting of compacted outer strands with Teufelberger-Redaelli SUPERFILL® compaction technology and a non-compacted independent wire rope core. Mainly used on Koepe friction winders and single-layer drum winders.

FIT FOR PURPOSE WITH INCREASED STRENGTH

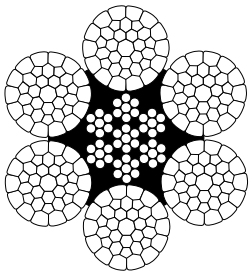
Specifications

- Lang lay or ordinary lay, right and left lay
- 19 – 23 mm: 6xK19S-IWRC
- 24 – 32 mm: 6xK26WS-IWRC
- 33 – 38 mm: 6xK31WS-IWRC
- 39 – 65 mm: 6xK36WS-IWRC
- Conformity: EN 12385-6 (other standards available upon request)
- Use without rope swivel
- Rope finish: bright, galvanized class B, ZnAl

✔ SUPERFILL®
✘ PLASTFILL®

Benefits

- Non-rotation resistant rope
- High breaking force
- Medium resistance to wear and drum crushing
- High flexibility and bending fatigue performance
- Low rope elongation
- Good radial stability



Technical data

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
6xK19S-IWRC	19		1.61	1.70	1.14	311	70,025	351	78,974	389	87,476	231	52,037	261	58,666	289	64,964
	19.05	¾	1.61	1.71	1.15	313	70,396	353	79,392	391	87,938	233	52,311	262	58,975	290	65,306
	20		1.69	1.88	1.26	345	77,615	389	87,531	431	96,951	256	57,659	289	65,004	320	71,982
	21		1.77	2.07	1.39	381	85,593	429	96,526	476	106,911	283	63,569	319	71,667	353	79,360
	22		1.86	2.28	1.53	418	93,961	471	105,959	522	117,358	310	69,767	350	78,655	387	87,098
	22.23	⅞	1.88	2.32	1.56	427	95,897	481	108,142	533	119,775	317	71,202	357	80,272	395	88,889
	23		1.94	2.49	1.67	457	102,718	515	115,832	571	128,290	339	76,254	382	85,968	423	95,196
6xK26WS-IWRC	24		1.89	2.60	1.74	476	107,074	537	120,743	595	133,728	369	83,029	416	93,606	461	103,654
	25		1.97	2.82	1.89	517	116,202	583	131,033	646	145,123	401	90,092	452	101,569	500	112,472
	25.4	1	2.00	2.91	1.95	534	119,957	602	135,267	666	149,811	414	92,998	466	104,845	516	116,099
	26		2.05	3.05	2.05	559	125,702	631	141,744	698	156,984	433	97,444	489	109,857	541	121,649
	27		2.13	3.29	2.21	603	135,575	680	152,875	753	169,309	467	105,083	527	118,470	584	131,187
	28		2.21	3.53	2.37	649	145,821	731	164,425	810	182,100	503	113,011	567	127,408	628	141,084
	28.58	1 ⅛	2.25	3.68	2.47	676	151,881	762	171,257	844	189,665	524	117,701	590	132,694	654	146,938
	29		2.29	3.79	2.55	696	156,439	785	176,396	869	195,355	539	121,228	608	136,671	673	151,342

Constr.	Nominal Ø		Outer wire Ø	Nominal rope weight*		Calculated (= min. aggregated) breaking force at rope grade						Minimum breaking force at rope grade					
						1570		1770		1960		1570		1770		1960	
	mm	inch	mm	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf	kN	lbf
	30		2.37	4.06	2.73	745	167,430	840	188,787	930	209,076	577	129,733	651	146,259	720	161,959
	31		2.45	4.33	2.91	795	178,793	897	201,598	993	223,262	616	138,526	695	156,172	769	172,936
	31.75	1 1/4	2.51	4.54	3.05	834	187,560	941	211,481	1042	234,207	646	145,309	729	163,820	807	181,405
	32		2.53	4.62	3.10	848	190,529	956	214,828	1058	237,913	657	147,607	740	166,410	820	184,273
6xK31WS-IWRC	33		2.24	5.00	3.36	917	206,260	1034	232,563	1146	257,552	698	156,976	787	176,973	872	195,971
	34		2.31	5.31	3.57	974	218,963	1098	246,885	1216	273,411	741	166,634	836	187,862	925	208,027
	35	1 3/8	2.38	5.62	3.78	1032	232,046	1164	261,635	1289	289,744	785	176,580	886	199,075	981	220,444
	36		2.45	5.95	4.00	1092	245,509	1231	276,812	1364	306,551	831	186,815	937	210,613	1037	233,221
	37		2.51	6.28	4.22	1154	259,350	1301	292,417	1440	323,830	878	197,338	990	222,476	1096	246,358
	38	1 1/2	2.58	6.63	4.45	1217	273,571	1372	308,449	1519	341,584	926	208,149	1044	234,664	1156	259,854
6xK36WS-IWRC	39		2.29	6.84	4.60	1256	282,268	1416	318,254	1568	352,441	975	219,248	1100	247,178	1218	273,711
	40		2.35	7.19	4.83	1321	296,940	1489	334,796	1649	370,758	1026	230,636	1157	260,016	1281	287,927
	41		2.41	7.56	5.08	1388	311,984	1565	351,756	1733	389,539	1078	242,312	1215	273,179	1346	302,504
	41.28	1 5/8	2.43	7.66	5.15	1406	316,187	1586	356,494	1756	394,786	1092	245,573	1232	276,856	1364	306,575
	42		2.47	7.93	5.33	1456	327,400	1642	369,135	1818	408,784	1131	254,276	1275	286,668	1412	317,440
	43		2.53	8.31	5.59	1527	343,187	1721	386,933	1906	428,493	1186	266,528	1337	300,481	1480	332,736
	44		2.59	8.71	5.85	1598	359,345	1802	405,150	1996	448,665	1241	279,069	1399	314,619	1550	348,392
	44.45	1 3/4	2.61	8.88	5.97	1631	366,737	1839	413,484	2037	457,894	1267	284,807	1428	321,088	1582	355,555
	45		2.64	9.11	6.12	1672	375,875	1885	423,786	2088	469,301	1298	291,898	1464	329,083	1621	364,408
	46		2.70	9.51	6.39	1747	392,776	1970	442,840	2181	490,401	1357	305,016	1530	343,871	1694	380,784
	47		2.76	9.93	6.67	1824	410,049	2056	462,313	2277	511,964	1416	318,421	1597	358,985	1768	397,520
	47.63	1 7/8	2.8	10.20	6.85	1873	421,033	2112	474,696	2338	525,677	1454	326,946	1640	368,596	1816	408,162
	48		2.82	10.36	6.96	1902	427,693	2145	482,205	2375	533,991	1477	332,115	1666	374,423	1844	414,615
	49		2.88	10.80	7.25	1983	445,709	2235	502,515	2475	556,482	1540	346,098	1736	390,186	1922	432,071
	50		2.94	11.24	7.55	2064	464,096	2328	523,245	2577	579,437	1603	360,368	1807	406,275	2001	449,886
	50.8	2	2.99	11.60	7.80	2131	479,073	2403	540,130	2661	598,134	1655	371,992	1865	419,380	2066	464,398
	51		3.00	11.70	7.86	2148	482,854	2422	544,393	2682	602,855	1668	374,927	1880	422,688	2082	468,062
	52		3.06	12.16	8.17	2233	501,984	2518	565,960	2788	626,737	1734	389,774	1955	439,427	2164	486,597
	53		3.11	12.63	8.49	2320	521,486	2615	587,946	2896	651,083	1801	404,910	2031	456,491	2249	505,492
	54	2 1/8	3.17	13.11	8.81	2408	541,359	2715	610,350	3007	675,892	1870	420,333	2108	473,879	2334	524,748
	55		3.23	13.60	9.14	2498	561,603	2816	633,174	3119	701,165	1940	436,046	2187	491,593	2421	544,363
	56		3.29	14.10	9.48	2590	582,219	2920	656,416	3233	726,902	2011	452,046	2267	509,631	2510	564,338
	57		3.35	14.61	9.82	2683	603,206	3025	680,076	3350	753,103	2083	468,335	2349	527,995	2601	584,672
	57.15	2 1/4	3.36	14.69	9.87	2697	606,386	3041	683,662	3368	757,073	2094	470,803	2361	530,778	2614	587,754
	58		3.41	15.13	10.16	2778	624,565	3132	704,156	3469	779,768	2157	484,911	2432	546,684	2693	605,367
	59		3.47	15.65	10.52	2875	646,295	3241	728,654	3589	806,896	2232	501,777	2516	565,697	2786	626,422
	60		3.53	16.19	10.88	2973	668,397	3352	753,572	3712	834,488	2308	518,930	2602	585,036	2882	647,836
	60.33	2 3/8	3.54	16.36	11.00	3005	675,660	3388	761,760	3752	843,555	2333	524,567	2631	591,391	2913	654,874
	61		3.58	16.73	11.24	3073	690,870	3465	778,907	3837	862,543	2386	536,372	2690	604,700	2979	669,611
	62		3.64	17.29	11.62	3175	713,715	3579	804,662	3964	891,062	2465	554,102	2779	624,688	3077	691,745
	63		3.70	17.85	11.99	3278	736,931	3696	830,836	4093	920,046	2545	572,121	2869	645,002	3177	714,240
	63.5	2 1/2	3.73	18.13	12.18	3330	748,678	3755	844,079	4158	934,711	2585	581,238	2915	655,281	3228	725,622
	64		3.76	18.42	12.38	3383	760,518	3814	857,428	4224	949,492	2626	590,427	2961	665,641	3279	737,094
	65		3.82	19.00	12.77	3490	784,477	3934	884,439	4357	979,403	2709	609,022	3054	686,605	3382	760,308

* Actual rope weight = nominal rope weight -2% +5%. Shown nominal rope weight for strand lubricated rope.
The table is for reference only. Additional rope diameters upon request. All ropes can be customized to specific applications.

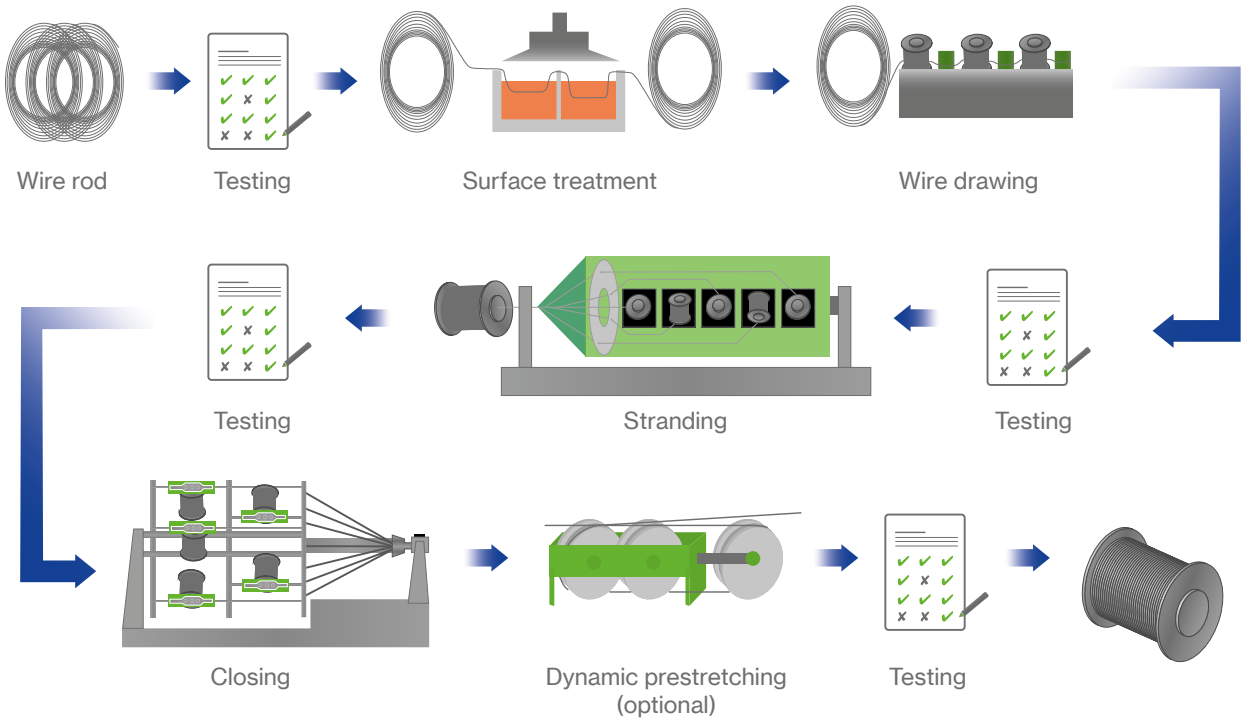
TECHNICAL SECTION

STEEL WIRE ROPE

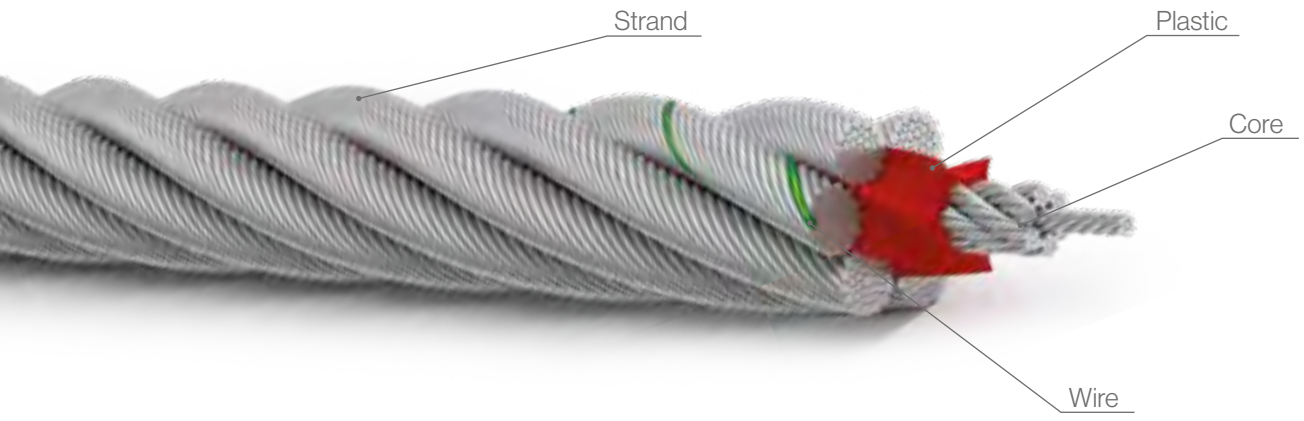
A steel wire rope is a complex mechanical (machine) component (in motion) that transmits force along its axis. It is made up of individual steel wires laid into strands. A number of strands are laid around a central core, thus forming a rope.

The main component of steel wire ropes is carbon steel which can be coated with zinc or a zinc alloy, e.g., Zn95/Al5. Besides the outer strands, the other components of a typical steel wire rope are the core which may also be of carbon steel, or else of synthetic fiber; the rope lubricant(s); and any internal filling or external covering, where applicable.

Making of wire ropes (simplified illustration)



Elements of a wire rope



Core

The three types of cores commonly used in wire ropes are:

* Independent wire rope cores (IWRC),
* Wire strand cores (WSC),
* Fiber cores (FC), mainly synthetic fiber cores (SFC).

The right choice of core largely depends on the specific application that the rope is intended for.

> The primary function of the core is to provide support to the outer layer strands. Additionally, fiber cores can store a significant amount of lubricant (lubrication function).

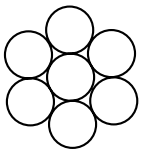
Strands

The wires are the main components of a wire rope. In case of stranded ropes, the wires are laid into strands (stranding) and the strands are subsequently laid into a rope (closing).

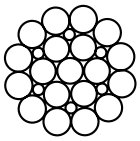
Strand designs

(Reference standard: EN 12385-2)

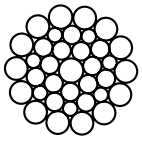
General rule: A rope with strands made up of a few large wires will be more abrasion resistant and less fatigue resistant than a rope of the same size made up of strands with many wires.



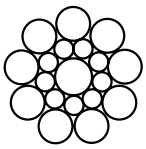
Single lay strand (1-6) = 7
This strand consists of a single-wire center with an outer layer of wires laid around it. All wires in the outer layer have the same diameter (usually different from the center wire).



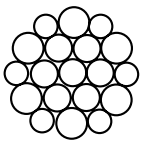
Filler (1-6-6F-12) = 25F
Two layers of uniformly sized wires around a center wire with the inner layer having half the wires as the outer layer. Small filler wires, equal in number to the inner layer, are laid in the valleys of the inner layer (parallel lay strand). Note: The strength of the filler wires is not considered for the minimum breaking force.



Warrington-Seale (1-7-7+7-14) = 36WS
A combination of the above-described Warrington and Seale constructions.



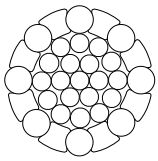
Seale (1-9-9) = 19S
Two layers of wires around a center wire. All wires in each layer are of the same diameter. The strand is designed in such a way that the large outer wires rest in the valleys between the smaller inner wires (parallel lay strand).



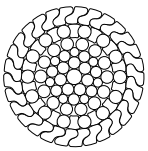
Warrington (1-6-6+6) = 19W
Two layers of wires around a center wire with wires of one diameter in the inner layer, and wires of a smaller diameter alternating with wires of a larger diameter in the outer layer. The larger outer wires rest in the valleys, and the smaller ones on the crowns of the inner lay (parallel lay strand).

Half- and full-locked coil ropes

(Reference standard: EN 12385-2)



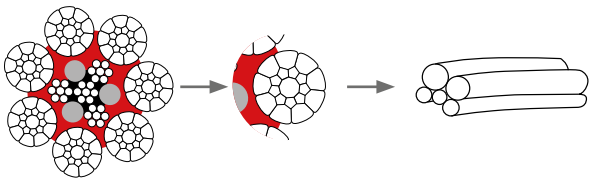
Half-locked coil (HLC)
Spiral rope with an outer layer of alternating round and H-shaped wires. Ideal as guide rope.

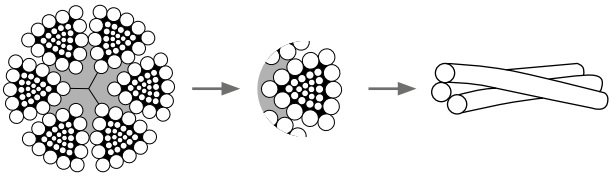


Full-locked coil (FLC)
Spiral rope with an outer layer of Z-shaped wires
Note: The rope can have several Z-shaped wire layers or one outer layer of Z-shaped wires and underneath it a layer of alternating round and H-shaped wires, depending on the application and the rope.

Parallel lay strands versus cross lay strands

Round strand ropes are made up of parallel lay strands whereas triangular strand ropes are made up of cross lay strands.



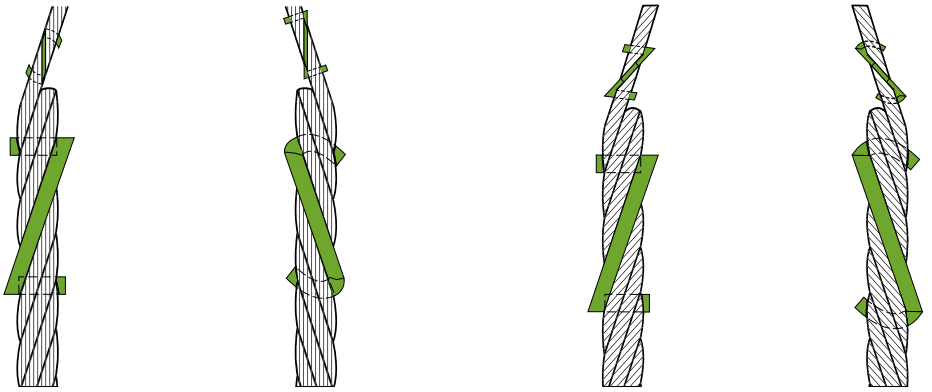


Parallel lay strands	Cross lay strands
The outer wires have the same lay length as the inner wires, which results in line contact between the wires within a strand and, consequently, low contact stress, no secondary bending, no internal wire nicking and wear.	The wire layers cross over one another and make point contact. This leads to high internal contact stress, secondary bending, internal wire nicking and wear.
High bending fatigue performance	Reduced bending fatigue performance
Ropes with parallel lay strands build up less torque and turn less often during a torque release (safer and easier handling)	Ropes with cross lay strands build up more torque and turn more often during a torque release
Parallel strands can be compacted	Triangular strands should not be compacted

All our stranded mining ropes are made up of parallel lay strands.

Lay directions and lay types of wire ropes

Depending on the direction of the outer strands, a rope is classified as either a right hand or a left hand rope. Additionally, depending on the lay direction of the wires in a strand, the rope is classified as either a regular lay or a lang lay rope. The lay direction of the wires in the strand is indicated first (lowercase letter), followed by the lay of the strands in the wire rope (capital letter).



Right hand regular lay (sZ) Left hand regular lay (zS) Right hand lang lay (zZ) Left hand lang lay (sS)

⚠ Regular lay ropes are also called ordinary lay ropes.

Lang lay versus regular lay ropes

Lang lay rope (same direction of lay of strand and wires of outer strand)	**Regular lay rope** (opposite direction of lay of strand and wires of outer strand)
Increased flexibility	Reduced flexibility
Increased bending fatigue performance	Reduced bending fatigue performance
Increased resistance to wear and crushing due to a more even outer surface and improved contact points (line contact)	Reduced resistance to wear and crushing due to rougher outer surface and more point-to-point contact
Slightly reduced rotational stability and slightly more torque buildup in operation	Slightly better rotational stability and slightly less torque buildup in operation

The most common lay type currently used in mining is the lang lay, as this lay type typically generates a longer rope service life (especially when used on multi-layer drum winders). The slightly higher torque factor of lang lay ropes and the slightly higher sensitivity against twisting can be kept to a minimum by means of a special rope closing process during production.

⚠ Lang lay ropes must be subject to regular electromagnetic rope inspections, especially when used on single-layer rope applications. Local mining regulations must be complied with.

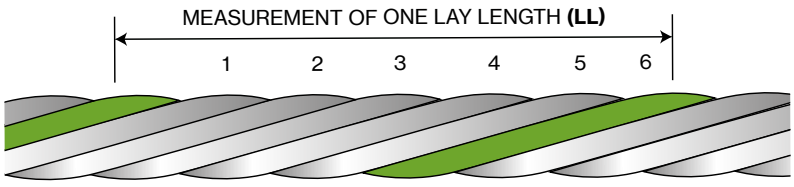
Lay length of a wire rope

That distance parallel to the longitudinal rope axis in which the outer wires of a spiral rope or the outer strands of a stranded rope make one complete turn (or helix) around the rope axis.

LL= (lay length of the rope) = **nominal rope diameter * lay length factor "LLF"**

LLF = multiple of nominal rope diameter (typical values for LLF: from 6 to 9)

A short lay length makes the rope more flexible. On the other hand, such a rope elongates more (spring effect).

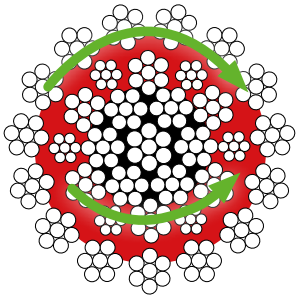


Example of an LL measurement on a 6-strand rope

Rotational stability of a wire rope

Rotation resistant and non-rotation resistant ropes

In general, any kind of rope component, i.e., wire or strand, which is laid in a helical shape around a core has a tendency to unlay under load and generates torque if rotation is prevented. This behavior is determined by the design of the rope and the combination of various rope properties. The strongest tendency to rotate can be found in single-layer ropes; especially in lang lay type ropes, where the torque buildup within the rope is slightly increased due to the fact that the wires and the strands are twisted in the same direction. Multi-strand ropes like 12-, 15- and 18-strand ropes are all rotation-resistant and have at least two layers of strands laid helically around a core. The direction of the outer strands is opposite to that of the underlying strand layers. Such ropes are low- or nearly non-rotating because the torque of the outer strands and the torque of the core strands balance each other out (metallic area of outer strands is similar to metallic area of core strands).



According to the definition of FEYRER (University of Stuttgart), a rope can be considered as rotation-resistant if it has a rotational property less than or equal to 1 turn on a length corresponding to 1000 times the nominal rope diameter when a force of approx. 15-20% of the MBF is applied.

Rope	Category	Torque factor (c1*) at 20% of MBF lang lay	Torque factor (c1*) at 20% of MBF regular lay
RED1T	Non-rotation resistant	0.17	0.12
PACK1T	Non-rotation resistant	0.17	0.12
RED1	Non-rotation resistant	0.13	0.09
PACK1	Non-rotation resistant	0.13	0.08
6MINE	Non-rotation resistant	0.13	0.08
7MINE	Non-rotation resistant	0.13	0.10
7MINE HD	Non-rotation resistant	0.13	0.10
8MINE	Non-rotation resistant	0.14	0.11
12MINE 400(P), 12MINE 440(P), 12MINE 460(P)	Rotation resistant	0.07	0.06
FLEXMINE 400(P), FLEXMINE 440(P), FLEXMINE 460(P)	Rotation resistant	0.04	0.03
FLEXPACK MINING (P) with 15 outer strands	Rotation resistant	0.04	0.03
FLEXPACK MINING (P) with 18 outer strands	Rotation resistant	0.02	0.02
IPERFLEX, IPERFLEX L, IPERFLEX H	Rotation resistant	0.03	0.02
Rope	**Category**	**Torque factor (c1*) at 20% of MBF for spiral ropes**	
FLEXGUIDE HLC	Rotation resistant	0.06	

* indicated “c1” values are calculated values and may defer from actual values

⚠ For single-fall unguided lifting operations or ropes used in connection with swivels, only rotation resistant ropes are to be used (e.g., shaft sinking projects, balance ropes, etc.). Rotation resistant ropes are also the preferred choice for support ropes (pilot ropes) used in rope installations.

Teufelberger-Redaelli recommendation
*Rotation resistant ropes have a low torque value and a low elongation but are more sensitive to external influences caused by the system, e.g., fleet angles, shock loads, etc., and are therefore exposed to a higher risk of failing due to basket and cork screw deformations and loose strands. Please contact your nearest Teufelberger-Redaelli Technical Sales Consultant (**wirerope@teufelberger.com**) for further advice on whether or not a rotation resistant rope shall be used in your case.*

Principal characteristics of a wire rope

The elements of a wire rope are arranged in a helical shape to achieve the rope's principal characteristics. The behavior of steel wire ropes depends on some specific technical characteristics that can be summarized as below:

• Rotational stability
Ropes can be built with rotational or anti-rotational behavior. Anti-rotational behavior is, e.g., mandatory for unguided single-fall applications.

• Radial stiffness (resistance to transverse pressure)
Radial stiffness is an essential characteristic in many rope applications, for example on multi-layer drum winders, where the rope is subjected at simultaneously to the pulling force and the compression caused by the upper layers.

• Resistance to wear
Big compacted outer wires if required by the application, e.g., on multi-layer drum winders.

• Flexibility / bending fatigue performance
Thin wires adapted to small diameter ratios (D/d). Important where bending fatigue is the main reason for rope discard (e.g., single-layer drum winders, friction winders).

• Shock resistance / resistance to dynamic stress
Capacity of the wire rope to absorb shock loads without suffering from permanent deformation or geometrical decomposition (e.g., during loading and unloading of skip). Ability to handle dynamic stress during acceleration and deceleration.

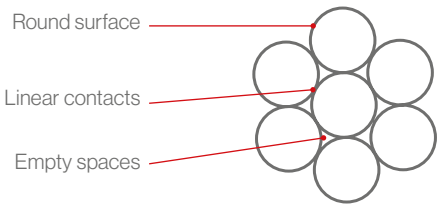
TEUFELBERGER-REDAELLI TECHNOLOGY

Compacted strands / “SUPERFILL® Compaction Technology”

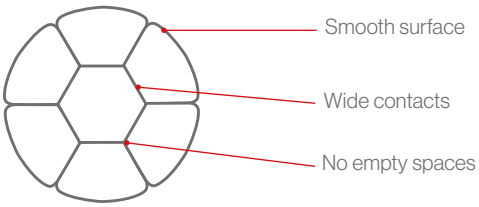
Strand compaction is a cold deformation process of the whole strand and its wires, achieved by the passage of the strand through a set of rollers (roller compacting).

By means of the compacting process, the following significant modifications of the wire shape are achieved:

- Increasing of strand fill factor → increased breaking force
- Wider contact surface between wires
- Smoother and more wear resistant strand surface
- Better tension distribution within the wires



Non-compacted strand



Compacted strand

Compaction is used to produce ropes with a higher breaking force (due to increased fill factor) which are able to work under higher lateral pressure conditions and where abrasion is a critical issue (due to a higher strand resistance and larger contact surface between wires as well as between the rope and the drum/sheaves).

Teufelberger-Redaelli recommendation

It is recommended to use ropes with compacted strands on multi-layer drum and winch applications. Compacted strands also increase the service life of friction liners due to an increased outer strand surface.

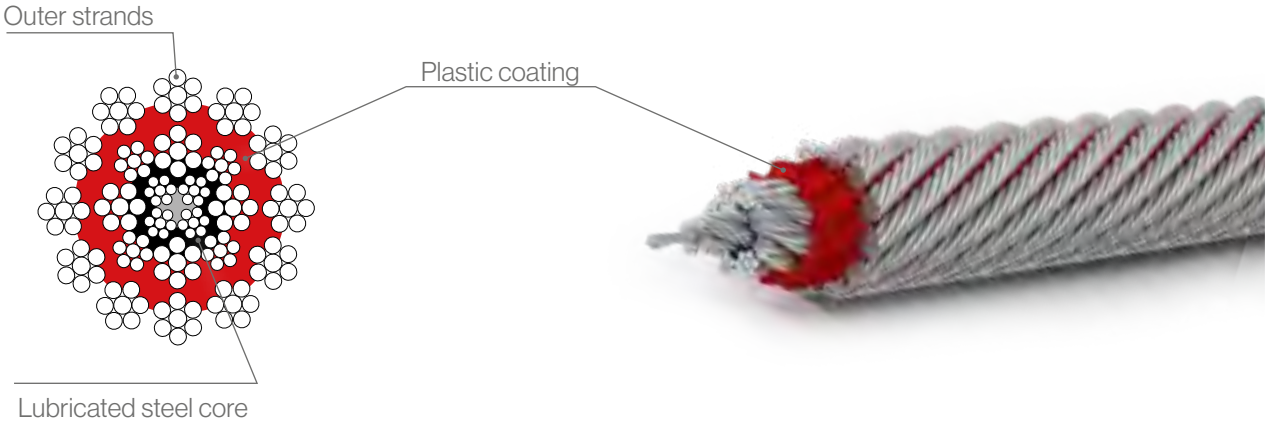
Plastic-coated core “Plastfill®”

PLASTFILL® is a plastic impregnation technology which adds specific characteristics to the rope with a positive impact on its service life.

Ropes with a plastic-coated core consist of an external layer of strands wound helically around the steel core once the core is coated with a protective plastic layer. Inserting a plastic layer drastically reduces any potential displacement of the various components that cohesively work together, and thus the plastic layer prevents geometric alterations within the rope.

A plastic coated core has the following advantages:

- ✔ Creates a mechanical joint that stabilizes and supports the positions of the individual components of the rope while allowing necessary movement.
- ✔ Drastically reduces internal corrosion processes by restricting the ingress of polluting agents.
- ✔ Filling the free space between exterior strands noticeably prevents friction wear damage.
- ✔ Makes the rope less vulnerable to shock loads, high fleet angles, and high transverse pressure



Teufelberger-Redaelli recommendation

It is recommended to use plastic-coated ropes for friction winder hoist ropes and for systems with increased fleet angles. For drum winders, it can be useful to use plastic-coated ropes to increase service life (depending on the system).

Wire finish (corrosion protection)

Bright (U):	Uncoated
Galvanized class B:	Zinc coated wires acc. to EN 10264-2 and EN 10264-3 (standard)
Galvanized class A*:	Zinc coated wires acc. to EN 10264-2 and EN 10264-3 (heavy galvanized)
Zn95/Al5:	Zinc 95%-Aluminum 5% alloy coated wires

* Available only for non-compacted balance ropes and for certain wire diameters.
Note: additional wire finish upon request.

Wire rope manufacturing standards

Our default standards for all our underground mining ropes are the European mining standards EN 12385-6 (stranded ropes) and EN 12385-7 (locked coil ropes). We can produce all our ropes in accordance with other mining rope standards upon request, e.g., CSA-G4, GB 8918, GOST, AS 3569, TAS 6.

ROPE WEIGHT

All our ropes in this catalog are designed in accordance with the European mining standards EN 12385-6 for round strand ropes and EN 12385-7 for locked coil ropes.

Type of rope	Actual rope weight
Round strand ropes	nominal weight -2% up to +5%
Locked coil ropes	nominal weight -4% up to +4%

Nominal rope weight = rope weight shown in the technical tables | Rope weight can be customized.

ROPE DIAMETER

All our ropes in this catalog are designed in accordance with the European mining standards EN 12385-6 for round strand ropes and EN 12385-7 for locked coil ropes.

Type of rope	Actual rope diameter
6, 7 and 8-strand fiber core ropes	nominal rope diameter +2% up to +5%
All other round strand ropes	nominal rope diameter -0% up to +5%
Locked coil ropes	nominal rope diameter -2% up to +2%

Nominal rope diameter = rope diameter shown in the technical tables | Rope diameter can be customized.

WIRE QUALITY

All our ropes in this catalog are in accordance with the European mining standards EN 12385-6 and EN 12385-7 and the high wire quality standards contained therein.

Hoist and guide ropes:	EN 10264-3 + higher quality standards defined by Teufelberger-Redaelli
Balance ropes:	EN 10264-2

LENGTHS

Nominal length	Tolerance
Up to 400 m (1312 ft)	0% to +5%
Over 400 m (1312 ft) up to 1000 m (3290 ft)	0 m (0 ft) to +20m (+66 ft)
Over 1000 m (3290 ft)	0% to +2%

Tolerances according to EN 12385-1

Ropes required with smaller tolerances, for example, ropes fitted with a termination at each end, upon request.

CHOOSING THE RIGHT ROPE FOR THE APPLICATION

Unfortunately, the perfect rope does not exist. Therefore, a rope is always a compromise between various properties, with the following factors to be taken into consideration.

- application
- system parameters
- environment in which the rope is used

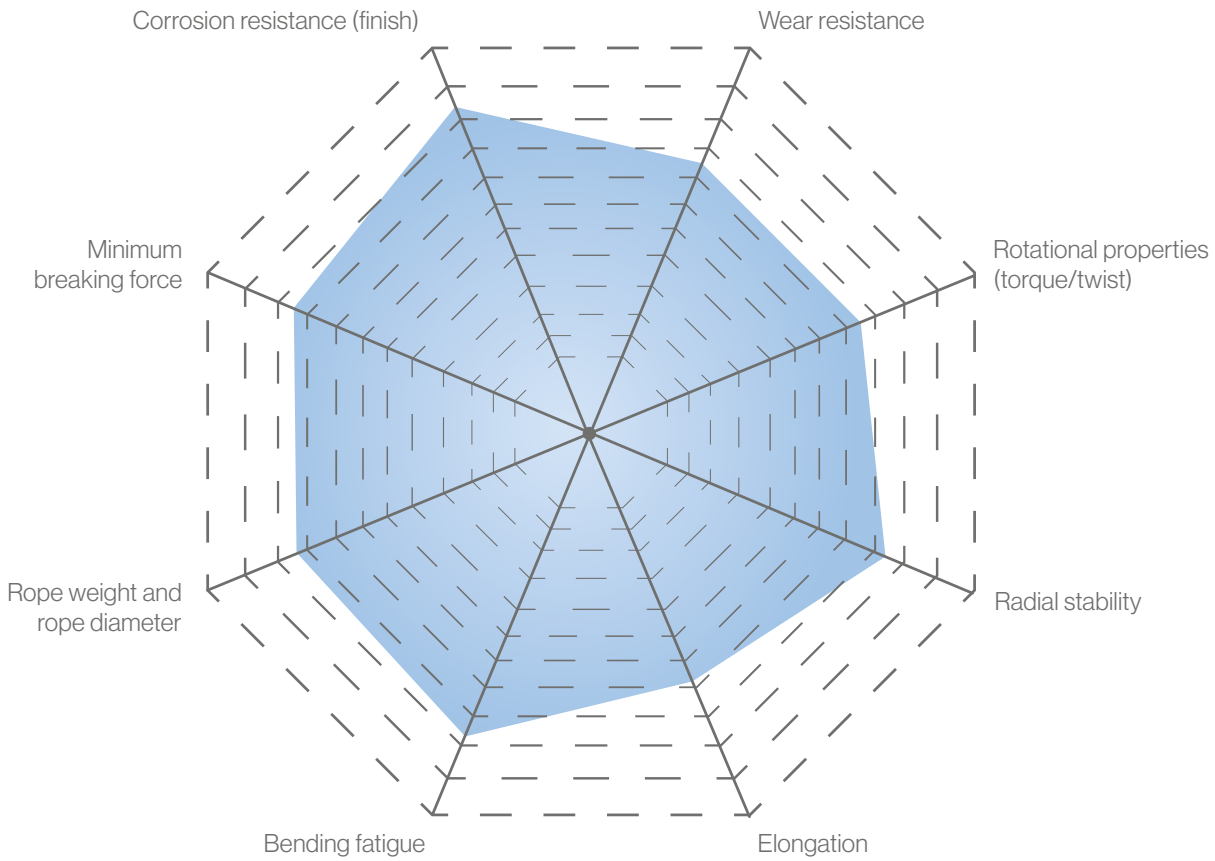
The challenge is to find the best compromise between the various rope properties so that the rope performance is optimized for the specific application and the given environment, resulting in a safe long rope service life and the best possible return on investment (maximum rope service life combined with minimized maintenance and downtime costs).

The blue surface shown below represents the rope service life.

We, together with our customers, maximize the size of the blue surface by adjusting every single rope property keeping your system parameters and environment in mind.

Teufelberger-Redaelli recommendation

*It is recommended to involve our rope specialists early on in your project (new hoist, hoist upgrade, or shaft sinking project) so we can assist you in choosing the right wire rope solution (**wirerope@teufelberger.com**).*

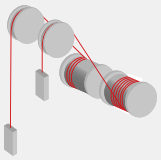


Hoist ropes

Careful consideration should be taken with regard to the application, the system parameters, maintenance procedures and the environmental influences when considering the most critical and important rope properties required.

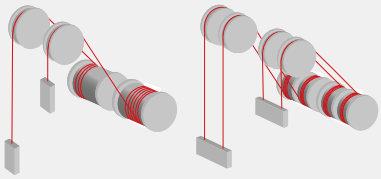
The following table shows important rope properties (besides breaking force, rope weight, rope diameter, finish, lubricant, radial stability) to be considered when choosing the ideal hoist rope for a specific application.

Single layer drum hoist

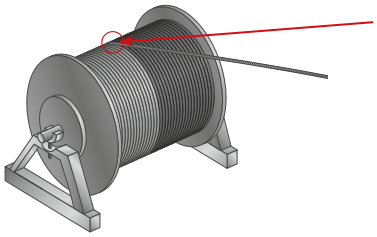


1. Rope property “High bending fatigue performance”	2. Rope property “Torque/Twist”	3. Rope property “Elongation”
The bending fatigue of a rope can be maximized by opting for: 1) relatively small wires 2) lang lay rope 3) parallel lay strands 4) low tensile grade wires 5) proper lubrication Note: The strand design of each rope can be customized.	1) Shafts deeper than 600 m (1968 ft) with wooden or rope guides (might) require rotation resistant ropes (“12MINE”, “FLEXMINE”, "FLEXPACK MINING"). With fixed guides, the use of non-rotation resistant ropes is also possible (“6MINE”, “7MINE”, “7MINE HD”, “8MINE”). 2) For shallow shafts up to 600 m (1968 ft), non-rotation resistant ropes (“6MINE”, “7MINE”, “7MINE HD”, “8MINE”) as well as rotation resistant ropes (12MINE", "FLEXMINE", "FLEXPACK MINING") can be used.	1) With increasing shaft depth, ropes with less rope elongation are recommended (rotation resistant or non-rotation resistant steel core ropes and compound core ropes).

Multi-layer drum hoist

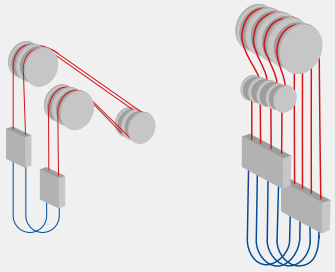


1. Rope property “Wear Resistance”	2. Rope property “Torque/Twist”	3. Rope property “Elongation”
How wear resistant a rope has to be depends on the system parameters (tread pressure, hoisting speed, etc.) Wear resistance can be maximized by opting for: 1) bigger outer wires 2) compacted strands 3) lang lay rope 4) big overall outer rope surface 5) higher wire grade (ideally not higher than 1960) ATTENTION: The right compromise between wear resistance and bending fatigue performance needs to be worked out. Note: The strand design of each rope can be customized.	1) Shafts deeper than 600 m (1968 ft) with wooden or rope guides (might) require rotation resistant ropes (“12MINE”, “FLEXMINE”). With fixed guides, the use of non-rotation resistant ropes is also possible (“7MINE”, “7MINE HD”, “8MINE”). 2) For shallow shafts up to 600 m (1968 ft), non-rotation resistant ropes (“7MINE”,”7MINE HD”, “8MINE”) as well as rotation resistant ropes (“12MINE”,”FLEXMINE”) can be used.	1) With increasing shaft depth, ropes with less rope elongation are recommended (rotation resistant or non-rotation resistant steel core ropes and compound core ropes).



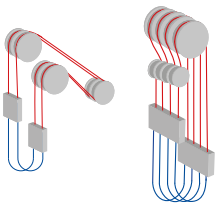
While abrasive wear can take place between the rope and the sheave and between the rope and the drum, the greatest cause of abrasion is often “rope interference” on the drum.

Friction hoist

Friction hoist		
		
1. Rope property “High bending fatigue performance”	**2. Rope property “Torque/Twist”**	**3. Rope property “Elongation”**
The bending fatigue of a rope can be maximized by opting for: 1) relatively small wires 2) lang lay rope 3) parallel lay strands 4) low tensile grade wires 5) proper lubrication Note: The strand design of each rope can be customized.	1) For shafts up to 1000 m (3280 ft), non-rotation resistant (“6MINE”, “7MINE”, “7MINE HD”, 8MINE) and rotation resistant ropes (“12MINE”, “FLEXMINE” , "FLEXPACK MINING") can be used. 2) For shafts deeper than 1000 m (3280 ft), only rotation resistant ropes (“12MINE”, “FLEXMINE”, "FLEXPACK MINING") should be used to reduce the risk of premature torsional fatigue of wires (the static load range of the system is to be considered). Note: Left hand and right hand ropes shall be used in pairs.	1) With increasing shaft depth (>1000 m/ >3280 ft), it is recommended to use steel core ropes due to significantly less rope elongation (e.g. “12MINE”, “FLEXMINE”, "FLEXPACK MINING") 2) With an increasing number of hoist ropes, it is recommended to consider steel core ropes, regardless of the shaft depth.

Balance ropes

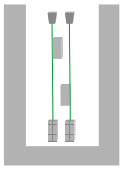
The Koepe friction winder system necessitates the use of balance ropes, also called tail ropes, to reduce the requirement for frictional force at the Koepe drum. The balance rope weight is normally designed to be equal to the weight of the head ropes; however, balance ropes slightly heavier than the head ropes can be advantageous during the ascent of the skip/cage. There is no necessity to have the same number of balance ropes as hoist ropes. It is advantageous to operate with as few balance ropes as possible.



The following table shows important rope properties (besides breaking force, rope weight, rope diameter) to be considered when choosing the ideal balance rope.

1. Rope property “High flexibility and bending fatigue performance”	**2. Rope property "Rotation resistance"**	**3. Rope property "Finish/Corrosion protection"**
1) Balance ropes are typically hanging freely underneath the skips/cages and form a natural loop. Taking into consideration the distance between the two anchor points of the rope ends, the rope must be flexible enough in order not to form a pear-shaped loop. Minimum distance values can be found on page 70 in this catalog. 2) We recommend the use of our “IPERFLEX” ropes with a min. distance between the anchor points of 45 times the rope diameter.	1) Use of rotation resistant ropes with freely operating swivels on each end of the rope (round strand ropes).	1) Very often shaft bottoms are wet and corrosive. Therefore, a proper corrosion protection must be applied. Wire finish: a) galvanized class B b) galvanized class A c) ZnAl coating

Guide ropes



We recommend the use of half-locked coil ropes as guide ropes. Our “FLEXGUIDE HLC” has been supplied successfully to the mining industry for many years and is available in various diameters, with different tensile grades and with different coatings (corrosion protection). Alternatively and upon request, we can also supply a full-locked coil rope, i.e., “FLEXGUIDE FLC”.

The following table shows important rope properties (besides breaking force, rope weight, rope diameter, finish, lubricant) to be considered when choosing the ideal guide rope.

1. Rope property "Wear resistance"	2. Rope property "Finish/Corrosion protection"
1) Regardless of the rope diameter, we optimize the wear resistance of the rope by choosing the optimal wire sizes. 2) The tensile grade of the wires also has an impact on the wear resistance. Taking into consideration the required breaking load, we find the right tensile grade for your guide ropes.	1) Very often shafts are wet and corrosive. Therefore, a proper corrosion protection must be applied. Wire finish: a) galvanized b) ZnAl coating

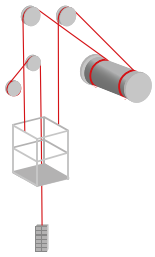
The ideal rope diameter and required rope breaking force depend upon local regulations for the factor of safety and the tensioning required. The rope safety factor for guide ropes in most countries is 5:1 at the point in the rope with the greatest tension. The minimum load applied to achieve the adequate rope tension is 3000 kg (6614 lbs) plus 500 kg/100 m (1102 lbs/328 ft) of rope length according to the British Deep Mined Coal Industry Advisory Committee 08/2004. Some regulations provide for higher rope loads, e.g., 10 kN/100 m (2248 lbs/328 ft) of rope length for a suspended rope length of up to 1000 m (3280 ft) and approx. 8 kN/100 m (1798 lbs/328 ft) of rope length for a suspended rope length of over 1000 m (3280 ft) (German mining standard TAS 6). In order to minimize harmonic oscillation of the ropes, the tension in the ropes should vary slightly (plus/minus 10% of the average tension applied).

⚠ Always refer to your local regulations for the minimum rope safety factor and the minimum rope tension required.

Teufelberger-Redaelli can also advise you on available attachment and tensioning systems (wirerope@teufelberger.com).

Shaft sinking ropes

1. Stage ropes



Shaft sinking projects require stage (winch) ropes for raising and lowering the working stage (Galloway).

The following table shows important rope properties (besides breaking force, rope weight, rope diameter, finish, lubricant, radial stability) to be considered when choosing the ideal stage rope.

1. Rope property “Rotation resistance”	2. Rope property “Wear resistance”
1) These slow moving ropes are often connected to the stage by combining an open spelter socket, a chaseblock and a swivel. Therefore, the stage ropes need to be rotation resistant ("FLEXMINE" or "FLEXPACK MINING").	1) Stage ropes are wound onto a winch in several rope layers and with a relatively small D/d ratio. Therefore, it is necessary that these ropes are resistant to wear and crushing. 2) Additionally, stage ropes are often used as guide ropes for the kibbles during the hoisting operation. This also requires some wear resistance. We recommend using compacted rotation resistant ropes like our "FLEXMINE 440", "FLEXMINE 460" or "FLEXPACK MINING".

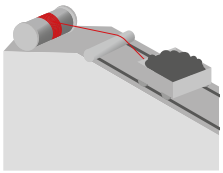
⚠ In addition to our FLEXMINE and FLEXPACK MINING ropes, we have special rotation resistant ropes available with improved breaking force to weight ratios. These ropes can be offered for special projects when a rope with superior performance values is needed and the cost of the rope is of secondary importance.

Suspension ropes for shaft boring roadheaders (SBR)
The FLEXMINE and FLEXPACK MINING ropes as well as other special high performance ropes (available upon request) are also ideal for the suspension of a shaft boring roadheader (SBR). These ropes can be used with small D/d ratios and in multi-fall configurations.

2. Kibble ropes

Kibble ropes must be rotation resistant to prevent excessive spin of the kibble or bucket in the shaft. Especially when the kibble reaches the shaft bottom, it ceases to be guided. When sinking deep shafts it could be beneficial to use two sets of kibble ropes. A shorter rope at the beginning which allows more adequate maintenance and reduces the risk of rope slackness in the dead turns with the consequential risk of rope distortion and premature rope failure, and a second longer one for the second phase of the sinking. We recommend for this application our proven FLEXMINE ropes with compacted strands.

Incline (Haulage) ropes



Incline ropes (also called slope hoist or haulage ropes) are used for both the transport of men and the supply of materials.

The following table shows important rope properties (besides breaking force, rope weight, rope diameter, finish, lubricant, radial stability) to be considered when choosing the ideal haulage rope.

1. Rope property "Wear resistance"
1) Wear resistance is the most important rope property since the ropes are used on multi-layer drums; very often they touch the ground and are exposed to dirt. 2) The rope needs to be robust since it can be easily damaged by falling objects or when run over by vehicles like forklifts. Wear resistance can be maximized by opting for: 1) bigger outer wires 2) compacted strands 3) lang lay rope 4) big overall outer rope surface 5) higher wire grade (ideally not higher than 1960) We recommend to use our "7MINE" or "7MINE HD" with 19S outer strands.

SPECIFIC WIRE ROPE TOPICS

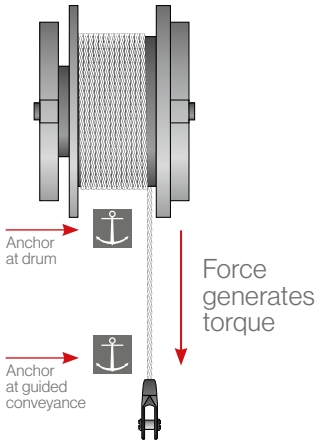
Rope torque

A load applied to a rope causes the rope to rotate and torque is built up if the wire rope end is prevented from twisting. The torque generated under load is usually directly related to the applied load by a constant torque factor "c1". Torque in a rope increases with the rope diameter. Non-rotation resistant ropes must be operated with both ends restrained from rotating; otherwise, the rope will unlay and become unstable. Rotation resistant ropes are designed to adjust to this torque and reach a balance so that this type of rope can be used with ends free to rotate.

The torque generated when loading a rope can be estimated from the following formula.

Generated torque $T = c1 * d * S$

T = torque [Nm]
c1 = torque factor [-]*
d = nominal rope diameter [mm]
S = rope load [kN]



Example

Rope:	FLEXMINE 460 RHLL
Nom. diameter:	45 mm
	T = 0.03 x 45 x 349 = 471 Nm
c1:	0.03
S:	20% of the MBF (1746 kN x 20% = 349 kN)

*c1 values can be found on page 56

Teufelberger-Redaelli recommendation

Should you experience problems with rope torque (e.g., skips/cages get twisted excessively by the currently used rope or the wooden, steel or rope guides show uneven wear or the skip/cage guide shoes show uneven wear or the rope turns during a torque release violently and more than 15 to 20 times, etc.) it might be better to choose a rope with a lower torque value.

Wire rope elongation

Permanent elongation of a rope (non-elastic)

Any new rope elongates elastically during the first commencement of loading and, in addition, a permanent elongation occurs which will become evident after releasing the load. The permanent elongation is caused by the various components “bedding down” with a corresponding reduction in overall rope diameter. The amount of reduction in overall diameter mainly depends on the type and construction of rope and the range of loads. Most of the permanent elongation occurs early in the life of a running rope, although slight permanent elongation will occur throughout the life of the rope. Fiber core ropes show significantly more permanent elongation in comparison to ropes with a steel core. Bending cycles also influence the amount of elongation.

The initial permanent elongation of a rope cannot be accurately determined by calculation. Reasonable values in % of rope length are shown in the table below.

System parameters	Fiber core rope	Stranded steel core rope	Locked coil ropes
Factor of safety of about 5:1	0.50%	0.25%	0.10%
Factor of safety of about 4:1	0.65%	0.35%	0.15%
Under certain circumstances, rope elongation can be significantly higher (very low safety factor, many bends, deflection sheaves, etc.)	1.00% to 2.00%	up to 1.00 %	

Please contact us for more precise figures based on your system parameters and requirements (wirerope@teufelberger.com).

Temporary elongation of a rope until its yield point (elastic)

The temporary (elastic) elongation of a rope can be calculated with reasonable accuracy using the formula below.

Temporary elongation in [m] $\triangle L = \frac{F \times L}{E \times A}$ where $A = C \times d^2$

F = load applied [kN]
L = length of rope [m]
A = nominal metallic cross-sectional area of rope [mm²]
C = nominal metallic cross-sectional area factor
d = nominal rope diameter [mm]
E = modulus of elasticity of rope [GPa]

⚠ Due to dynamic effects, the actual temporary rope elongation can be twice as high as the calculated value.

The table below gives approximate values for the metallic area and modulus of elasticity for ropes of various constructions.

Rope	Nominal metallic cross-sectional area factor (C)	Modulus of elasticity (E) [GPa] *)
RED1T	0.40	115
PACK1T	0.45	120
RED1 (P)	0.48	120
PACK1 (P)	0.54	120
6MINE	0.50	115
7MINE	0.50	115
7MINE HD	0.54	115
8MINE	0.49	115
12MINE 400(P)	0.46	105
12MINE 440(P)	0.51	120
12MINE 460(P)	0.53	125
FLEXMINE 400(P)	0.48	105
FLEXMINE 440(P)	0.52	115
FLEXMINE 460(P)	0.56	125
FLEXPACK MINING (P) with 15 outer strands	0.60	130
FLEXPACK MINING (P) with 18 outer strands	0.57	125
IPERFLEX	0.48	105
IPERFLEX L	0.45	100
IPERFLEX H	0.52	110
FLEXGUIDE HLC	n/a	125 - 150

*) Theoretical values according to ISO tolerance ± 10 GPa

Thermal expansion and contraction

Steel wire ropes increase in length with rising temperatures and decrease in length with falling temperatures.

The coefficient of linear expansion (α) of a steel wire rope is 0.0000125 = (12.5×10^{-6}) per °C

Change in length $\triangle L\,[m] = \alpha \times L \times \triangle t$

L = original length of rope [m]
$\triangle t$ = temperature change [°C]

Total elongation = permanent elongation + temporary elongation + thermal expansion (contraction)

Teufelberger-Redaelli recommendation
Should you experience problems with rope elongation during the loading/unloading of the skip, a rope with a higher modulus of elasticity could be considered. Ropes with reduced elongation properties can help reduce the amount of maintenance needed when the ropes are used as hoist ropes on multi-rope friction winders (e.g., no or less shortening of ropes, less re-tensioning of ropes, longer friction liner service life, etc.). Fiber core ropes can be pre-stretched upon special request and at an extra cost.

Note: Pre-stretching is carried out during the closing process of the rope. Applied pre-stretching loads can be adjusted to the rope requirements.

⚠ SAFETY: A long non-elastic elongation and energy absorption section is essential from a safety point of view, since it implies that a rope will not break suddenly and unexpectedly, but any damage can be clearly detected and identified by a competent person during a "warning period".

Tread pressure

Ropes are subject to radial pressure when they make contact with the sheave and the drum groove surface. This pressure distorts the rope's structure and affects the rate of wear of the sheave and the drum grooves. On a multi-layer drum winder, the tread pressure directly correlates with the amount of plastic deformation and wear in the turn cross-overs, especially in the first rope layer caused by the second rope layer (Note: A high tread pressure is only one factor for cross-over wear and plastic deformation). The actual pressure applied is a function of the rope tension (T), the rope diameter (d) and the sheave or drum diameter (D).

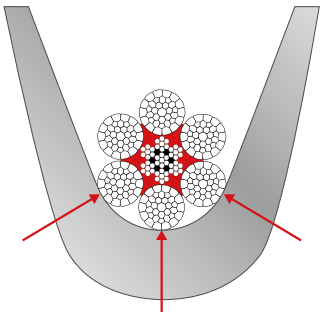
Tread pressure in [N/mm²] $p = \frac{2 \times T}{D \times d}$

p = tread pressure [N/mm² = MPa]
T = rope tension [N]
D = diameter of sheave or drum [mm]
d = nominal diameter of rope [mm]

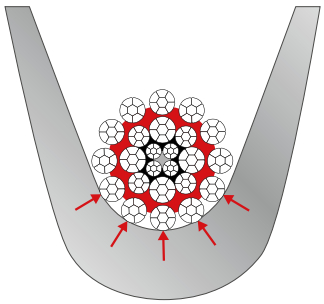
The value calculated in this way is always lower than the real pressure, because there are relatively few contact points. These contact points and the total surface contact area depend on the rope type used.

As an example, the picture below shows a 6-strand rope and a rotation resistant multi-strand rope with compacted outer strands.

Six strand rope



Rotation resistant multi-strand rope



The actual pressure should be lower than the maximum value to avoid damaging the strands due to localized excess pressure (especially in multi-layer drum winder systems).

Teufelberger-Redaelli recommendation

Drum winder

It is recommended to keep the tread pressure (p) below 3.5 N/mm² (510 psi), especially for multi-layer drum winder hoists. High values lead to a plastic deformation of the crown wires and eventually to split wires and premature wire breaks. One can then only try to avoid a short rope service life by increased maintenance efforts (e.g., more frequent drum end cuts, etc.).

Friction winder

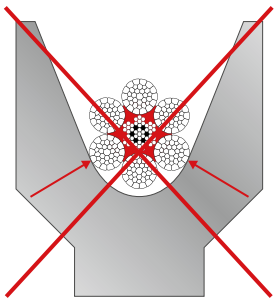
The tread pressure (p) should not exceed 1.72 N/mm² (250 psi) for stranded ropes and 2.75 N/mm² (400psi) for locked coil ropes. For stranded ropes for cage hoists, the value should not exceed 2.0 N/mm² (290psi), especially when considering occasional heavy payloads. If tread pressures are higher, the friction liner's service life will be negatively affected.

Sheave grooves

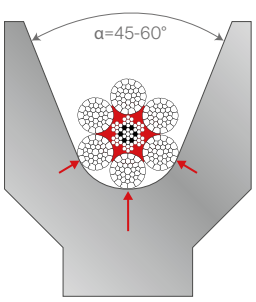
Excessive lateral deviation on the sheave may lead to serious damage to the wire rope. The correct dimensioning of the groove is therefore essential for the rope's service life. Never use a sheave with grooves whose corresponding diameter is smaller than the actual diameter of the wire rope.

Always ensure that:
✔ the diameter of the groove is larger than the actual diameter of the rope.
✔ the groove is not worn (no indentations)
✔ the groove allows slight lateral deformation of the rope.

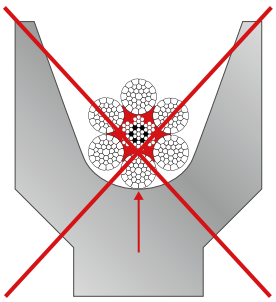
1. Wrong: Groove too narrow



2. Correct: Groove supports approx. 1/3 (38%) of the rope circumference (120...130°)



3. Wrong: Groove too wide



The correct scaling of the grooves must be as follows:

Minimum diameter of new groove:	Ømin	=	1.05 x d	d = nominal diameter of rope [mm]
Maximum diameter of new groove:	Ømax	=	1.10 x d	

Recommended diameter of new groove (drum winder): 1,10 x d (rotation and non-rotation resistant ropes).
Recommended diameter of new groove (friction winder): 1,07 x d (non-rotation resistant ropes)
Recommended diameter of new groove (friction winder): 1,10 x d (rotation resistant ropes)

The recommended groove diameters and the angle Alpha apply also to synthetic groove liners (e.g., Polyurethane liners).

Sheaves should be made of a material that is sufficiently hard to avoid rapid wear and indentations in service. Materials with hardness values of around 240 – 300 Brinell should show good results in most cases. If the pressures are too high for the sheave or drum material, the sheave or drum diameter could be increased which would also improve the service life of the rope. If this is not possible, using a rope with a bigger overall outer surface could be contemplated.

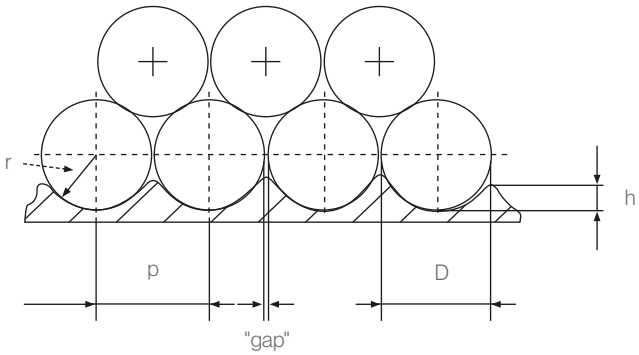
For high speed winding, the head sheaves should be 100 – 120 times the diameter of the rope. See also South African Standard SABS 0294 for further information and guidance.

Teufelberger-Redaelli recommendation
Always check the actual groove diameter and check for the existence of indentations before installing a new rope. Should the actual groove diameter be too small and/or should any indentations be sharp-edged and/or relatively deep, the groove needs to be re-machined. In some cases, it is possible to customize the new rope so it fits the existing groove conditions.

Drum grooves

The grooves on the rope drum must be suitable to accommodate the rope diameter. The groove diameter should never be smaller than the actual rope diameter:

d = nominal rope diameter
D = actual rope diameter
p = groove pitch
p = d + 5.5% to 7% ("gap" must be maintained at all times)
h = 0.3 x d
r = groove radius
Min. groove diameter = d + 5.5%
Ideal groove diameter = d + 7.5%

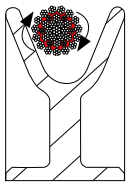


Teufelberger-Redaelli recommendation

Always check the actual groove diameter and check for the existence of indentations before installing a new rope. Should the actual groove diameter be too small and/or should any indentations be sharp-edged and/or relatively deep, the groove needs to be re-machined. In some cases, it is possible to customize the new rope so it fits the existing groove conditions. For single-layer drum winders, it is best to use a spiral grooved drum.

Fleet angle

The fleet angle is defined as the largest angle of the rope between the first sheave and the drum flange, relative to the centerline of the drum.



Whenever a rope passes a sheave with a fleet angle, a rotation is induced in the rope which leads to either a shortening or lengthening of its lay length. This mainly occurs when the distance between the drum and the sheave is too short. The amount of twist induced in a rope increases with an increasing fleet angle.

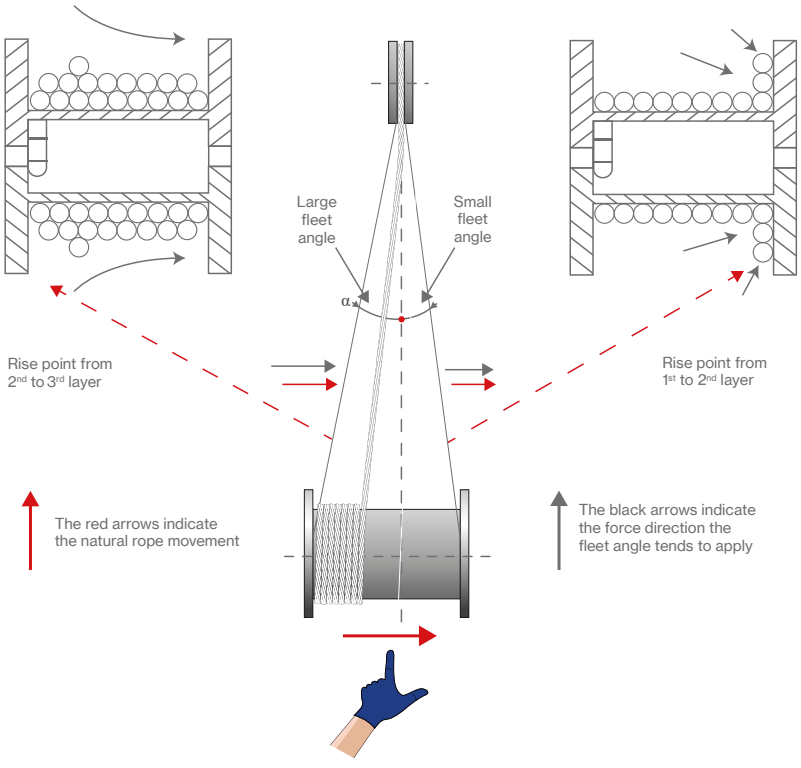
Fleet angles for grooved drums		
	Recommended fleet angle	**Max. fleet angle**
Non-rotation resistant ropes	0.5° - 1.5°	2°
Rotation resistant ropes	0.5° - 1.5°	2°
Full and half locked coil ropes	0.5° - 1.2°	1.5°

Note: For plain drums, it is recommended to limit the maximum fleet angle to 1.5° for non-rotation resistant ropes and to 1.2° for rotation resistant ropes including half and full locked coil ropes

⚠ The indicated maximum fleet angles for ropes should never be exceeded. Friction winders should ideally have no fleet angles. Plastic coated ropes are less sensitive to fleet angles.

Why is a correct fleet angle important?
Excessive fleet angles can lead to distortion of the steel wire rope.
Excessive fleet angles can result in abrasion between the rope and the sheave groove flange.
Helps to ensure correct spooling • A fleet angle that is too small, i.e., less than 0.5°, can cause the rope to pile up at the drum flange. Eventually, the piled up rope will roll away from the flange and undesirable shock loads and unsafe operating conditions are the consequence. • An excessive fleet angle will force the rope to rise prematurely and can create gaps between the wraps of the rope close to the flanges.

The rope in the second layer is forced to rise once it reaches the left hand flange. At this point, the force of the natural tendency of the left hand lay rope and the force direction of the large fleet angle are oriented towards the right hand flange. The result is that the rope will most likely want to skip a wrap or two as shown on the left of the sketch. This is devastating in case another layer is to be coiled on top (top layer would cut into the layer below).



On the bottom layer, the rope is controlled by the drum grooves and moves away from the left hand flange (connection point). Once it has arrived at the right hand flange, the rope is forced up to the second layer. Now it is balancing on top of the wrap below it, with the force of the natural tendency of the left hand lay rope and the force direction of the small fleet angle oriented towards the right hand flange. This makes the rope reluctant to leave the flange, and the wraps tend to "pile up" as shown on the right side of the sketch. The result is a very hard crossover leading to prematurely broken wires.

In this scenario, the effects on a left hand lay rope with a very large fleet angle on the left hand side and a very small fleet angle on the right hand side are considered. There are three layers of rope on the drum, with the rope being connected on the left hand flange. Based on the Hand Rule, we know that the rope wants to move naturally towards the right.

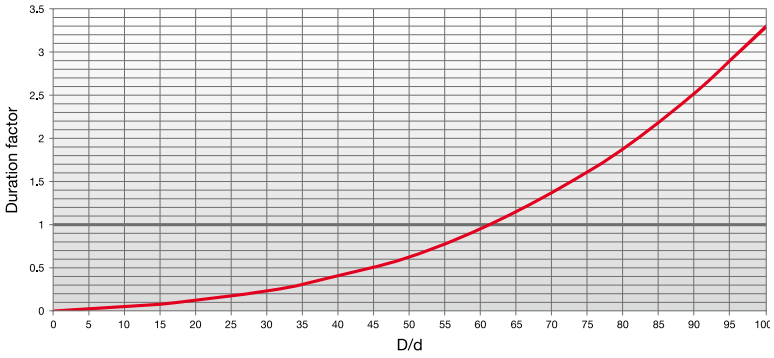
⚠ An indication of an incorrect fleet angle is rapid wear of only one of the flanges of a sheave and/or an uneven buildup of rope lubricant on the flanges.

Bending fatigue

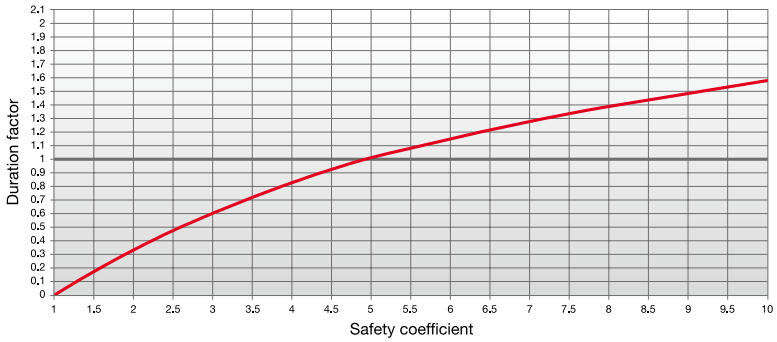
When a rope is bent over a sheave (drum), its components (wires) re-align themselves relatively to each other to equalize the stress throughout the cross-sectional area of the rope. Equalization can only be partially achieved and the outer wires experience an increased stress level. The increased stress leads to a reduced fatigue life which itself is an inverse function of the sheave (drum) diameter. The smaller the sheave (drum) to rope diameter the greater the bending stress and the higher the reduced fatigue life. To accurately calculate the additional stress imposed upon a rope due to bending, one must factor in the rope construction, internal lubrication, hoisting speed, and sheave groove geometry, and such calculation is therefore very difficult.

⚠ A change in direction of a rope of 15° or more is considered a complete bend. When bent over a sheave, wires are subject to alternating bending stresses which eventually lead to fatigue breaks with a characteristic square-ended fracture.

Predicting the service life of a rope (expressed as an absolute number of work cycles) without experimental data obtained under conditions similar to the actual operating conditions is difficult, and any prediction is subject to a significant degree of disparity in the results obtained.



The graph shows the relative service life of a rope with various D/d ratios. The reference duration (equal to 1) was obtained by testing with D/d = 62. Different D/d ratios decrease or increase the rope service life according to a duration factor as shown in the graph. It can be seen that with an increasing D/d ratio the expected rope service life increases exponentially.



The graph shows that the bending fatigue performance of a rope also depends on the load applied. With an increasing rope safety factor (= decreasing nominal load), the bending fatigue performance of a rope increases as can be seen in the graph. The reference duration (equal to 1) was obtained by carrying out testing with a safety coefficient of 5.

Teufelberger-Redaelli recommendation

A practical way to predict the rope service life of a new rope construction is to consider the average rope service life of the last three rope constructions used in combination with the rope service life achieved with the new rope under similar conditions.

Minimum D/d ratios

The tables below show recommended minimum D/d ratios for various rope constructions in combination with different applications. For smaller D/d ratios, please contact us (wirerope@teufelberger.com).

Rope	Min. D/d at slow speeds (≤ 1 m/s, 197 ft/min) (e.g., winches, rope installations, doubling down sheaves)
RED1T, PACK1T, RED1, PACK1	35*
6MINE, 7MINE, 7MINE HD, 8MINE	35*
12MINE 400(P), 12MINE440(P), 12MINE 460(P)	35*
FLEXMINE 400(P), FLEXMINE 440(P), FLEXMINE 460(P)	35*
FLEXPACK MINING(P)	35*
IPERFLEX, IPERFLEX L, IPERFLEX H	35*
EXTRAFLEX EVO	45*
FLEXGUIDE HLC, FLEXGUIDE FLC	45*

*With increasing speed, the D/d ratio has to increase too.

Note: The South African Standard SABS 0294 specifies that the ratio shall not be less than 40 + (4*v), where v is the rope speed in m/s, but must not exceed 140.

Rope	Min. anchor point distance for balance ropes
12MINE 400, 12MINE 440, 12MINE 460	60 * d
FLEXMINE 400, FLEXMINE 440, FLEXMINE 460	45 * d
FLEXPACK MINING	45 * d
IPERFLEX, IPERFLEX L, IPERFLEX H	45 * d

⚠ The recommended D/d ratios refer to complete bends, i.e., a change in direction of a rope of 15° or more.

⚠ In any case, local regulations and standards have to be observed and may overrule the indicated minimum D/d ratios or may lead to a derating of a rope since a certain amount of bending stress has to be additionally considered for the rope safety factor calculation.

Reverse bend

When two sheaves are used in a system, leading to a reverse bend situation for the rope, it is important to have a minimum distance between the two sheaves so that the wires in the rope have enough time to change position and no severe fatigue occurs (e.g., tower-mounted friction winder with deflection sheave). It is recommended that the length of the rope from the point of departure from one sheave to the point of contact on the other sheave should not be less than the length given by the two formulas below (the higher value of the two formulas applies):

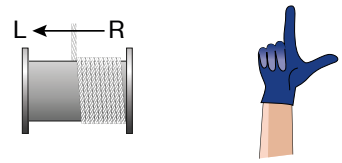
$$R > v \times t = v \times 0.5$$
$$R > 200 \times d$$

R = rope length between sheaves [m]
v = maximum rope speed [m/s]
t = readjustment time of 0.5 seconds
d = nominal rope diameter [mm]

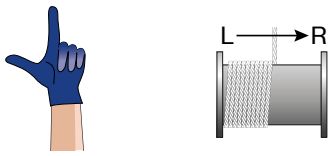
Choosing the correct lay direction of the rope

Both the lay direction of the rope and the rotation direction of the winch/drum shall be taken into account as shown below:

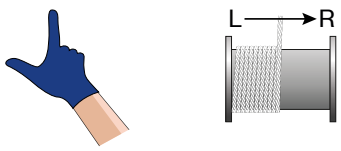
a) Right hand lay rope – underwind



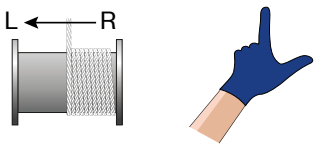
b) Left hand lay rope – underwind



c) Right hand lay rope – overwind



d) Left hand lay rope - overwind



The lay direction of a rope is crucial for the performance and the lifetime of a wire rope. The correct lay direction ensures that the rope in the bottom layer rotates in the direction which ensures that the rope construction closes during the upwinding. This ensures proper support of the second layer and increases the rope's service life. Furthermore, the correct lay direction can improve spooling when a fleet angle is slightly out of specification (too small).

In order to select the correct rope lay direction, each installation must be evaluated on its own and the following factors must be considered:
- Fleet angles
- Hoisting layout / configuration & position of drum hawse-hole (side on which the rope is attached to the drum)
- Hand Rule – determining the natural direction a rope will take

Rope oscillation

Hoist ropes of multi-layer drum winders often experience severe oscillation between the headgear sheave and the hoist drum during some part of the hoisting cycle. Once a winder is installed and commissioned, this problem is difficult to overcome. Therefore, it must be addressed when the hoist manufacturer designs a new hoist (e.g., asymmetric Lebus shells, distance between head sheave and hoist, etc.). To keep the oscillation of the rope to a minimum, it must be ensured that the fundamental frequency of vibration of the rope and the impulse from the turn cross-overs on the drum do not coincide.

The formula for the vibration of a stretched string can be used to calculate with sufficient accuracy the fundamental frequency of vibration of a rope.

$$f = \frac{\sqrt{\frac{T}{m}}}{2 \times L}$$

f = fundamental frequency [Hz]
L = rope length from drum to head sheave [m]
T = tension in rope [N]
m = mass per unit of rope [kg/m]

Multi-layer drum winder and required rope tension during rope installation and after drum end cuts

Multi-layer drum winder hoist ropes must be properly tensioned when initially installed or when reinstalled after a drum end cut to prevent loose dead wraps and the associated problems as long as possible. The minimum tension should be half the normal working tension, which can be applied by doubling down with a fully loaded conveyance or by using a capstan winch.

Experience has shown that applying a tension which is 60% - 80% of the normal working tension can increase both, the number of hoisting cycles between two drum end cuts and the overall rope service life.

⚠ If the dead wraps are not overlapped by a second rope layer, the load can be reduced to approx. 2% - 5% of the minimum breaking force of the rope and this load can be applied by doubling down with an empty conveyance or by using a capstan winch.

⚠ Drum end cuts are critical on most multi-layer hoists to achieve a long rope service life. The aim is to slip a new section of rope into the wear zone before too much rope damage occurs.

⚠ Newly installed Kibble ropes for a shaft sinking project should be tensioned with a load higher than achieved by doubling down with a fully loaded conveyance, since the amount of dead wraps is typically much higher compared to permanent hoist ropes (increased risk of rope slackness and consequential rope distortion and premature rope failure – broken wires).

Various codes of practice for rope examination and rope discard

- ISO 4309:2010 (Note: Cranes - Wire ropes – Care and maintenance, inspection and discard)
- South Africa: SABS 0293 - Condition assessment of steel wire ropes on mine winders
- Canada: 2020 Occupational Health and Safety Act R.R.O. 1990, Reg. 854: Mines and Mining Plants, as amended up to O. Reg. 187/19 “MOL Green Book”
- USA: MSHA CFR 30 – Mineral Resources
- Australia: AS/NZS 4812:2003 – Non-destructive examination and discard criteria for wire ropes in mine winding systems
- UK: BS 6570:1986 Code of practice for the selection, care and maintenance of steel wire ropes
- Russia: RD 03-439-02 "Instruction for using steel wire ropes in mine shafts"

Please always refer to the latest version.

DEFINITONS AND VARIOUS TERMINOLOGIES

Strand construction

N	Normal (symbol can be omitted)
S	Seale
W	Warrington
WS	Warrington-Seale
F	Filler

Lays and lay directions

RHRL	Right hand regular lay (sZ)
LHRL	Left hand regular lay (zS)
RHLL	Right hand lang lay (zZ)
LHLL	Left hand lang lay (sS)

Regular lay ropes are also called ordinary lay ropes.

Type of core

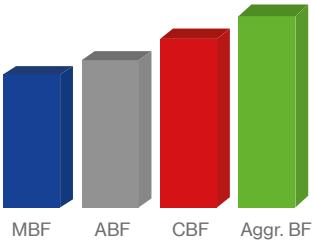
FC	Fiber core
SFC	Synthetic fiber core
IWRC	Independent wire rope core
EPIWRC	Independent wire rope core covered with a polymer
WSC	Wire strand core

K	Compacted strands

Rope grade	Approx. equivalent	Approx. hardness “Rockwell C”	Approx. hardness “Brinell”
1570	PS = Plow steel	45	405 / 425
1770	IPS = Improved plow steel	49	445 / 470
1960	EIPS = Extra improved plow steel	51	470 / 480
2160	EEIPS = Extra extra improved plow steel	52	480 / 500

Rope grade: Classification of the wire rope’s tensile grade and basis for the rope’s calculated breaking force.
Note: The nominal rope grade does not necessarily correspond to the nominal tensile grades of the wires used in a rope.

Breaking force



MBF..... Minimum breaking force
[minimum force of whole rope below which the actual breaking force is not allowed to fall]
ABF..... Actual breaking force
[actual strength of whole rope obtained through a test to destruction].
CBF..... Calculated breaking force
[metallic area times nominal rope grade]
Aggr.BF..... Aggregated breaking force
[sum of the measured breaking forces of all individual wires taken from the rope after spinning].

Fill factor (f): The ratio between the sum of the nominal metallic cross section of the strand or rope and the circumscribed area of the strand or rope based on its nominal diameter (Amet/Anominal)

Torque factor (c1): Determines the relationship between the wire rope tension and the corresponding torque, assuming that the wire rope end will be prevented from rotating.

Layer cross-over: The movement of the rope from one layer to the next layer on a multi-layer drum winder, also called “drum interlayer cross-over”.

Turn cross-over: The movement of the rope from one wrap to the next wrap in the same rope layer, also called “interlayer cross-over”.

Plastic deformation: Deformation of steel wires due to heavy side (or axial) pressure to rope.

Seizing: A wrapping or serving, particularly a wrapping or serving of wire, around a wire rope at its ends, to keep the rope from "flying apart".

Hoisting cycle: Defined as the movement of a hoist rope from the unloading position of the skip/cage to the loading position and back.

Various conversion factors

25.4 mm	1 in
304.8 mm	1 ft
1 m	3.28084 ft
1 kg	2.204622 lb
1 kgf	9.80665 N
1 kN	224.808943 lbf
1 metric ton	1.10231 American tons (short ton)
1 metric ton	9.80665
1 kg/m	0.671969 lbs/ft
1 lbs/ft	1.488163
1 m/s	196.8504 ft/min
1 km/h	0.277778 m/s
1 N/mm²	1 MPa

HOW TO REQUEST AN UNDERGROUND MINING ROPE

Inquiry Datasheet Mining

Internal number:	**Sales Manager:**	**Date:**		
1.	**Customer information**			
1.1.	Company name			
1.2.	Company address			
1.3.	Contact person			
1.4.	Phone			
1.5.	E-mail			
1.6.	Place and country of installation			
1.7.	Shaft name or no.:			
1.8.	Type of shaft	Service ☐	Production ☐	Other ☐ (describe)

2.	**Wire rope information**					
2.1.	Application (type of rope)	Hoist ☐	Guide ☐	Balance ☐	Shaft sinking ☐	Other ☐ (please describe)
2.2.	Wire rope	First install. ☐		Replacement ☐		
2.3.	Relevant wire rope standard, e.g., EN12385, CSA G4 Canada, ...					
2.4.	Nominal rope diameter [mm, inch]					
2.5.	Rope construction currently in use, e.g., 6xK19S, 8xK26WS-IWRC, triangular strand 6x30, ...					
		Compacted ☐		Non-compacted ☐		
2.6.	Core	FC ☐		IWRC ☐		
2.7.	Lay type	Regular ☐		Lang's lay ☐		
2.8.	Lay direction	Right ☐		Left ☐		
2.9.	Nominal rope weight [kg/m or lbs/ft]					
2.10.	Length of rope [m or ft]					
2.11.	Number of ropes needed					
2.12.	Wire finish	Bright ☐		Galvanized class B ☐		Others (please describe)
2.13.	Nominal tensile strength [N/mm²]					
2.14.	Minimum breaking force [kN or lb]					
2.15.	Min. aggr breaking force [kN or lb]					
3.	**System information**					
3.1.	Shaft depth [m]					
3.2.	Type of hoist	Drum hoist		Tower-mounted friction hoist ☐		
		Single drum ☐		Ground-mounted friction hoist ☐		
		Double drum ☐		No. of hoist ropes		
		Blair double drum ☐				
		Type of grooving	Lebus ☐			
			Helical ☐			
		No. of rope layers				

3.3.	Guide system	Fixed guides ☐	Rope guides ☐	Wooden guides ☐
3.4.	Drum diameter [mm or ft]			
3.5.	Required minimum rope safety factor			
3.6.	Weight of skip incl. attachments [kg or lb]			
3.7.	Payload [kg or lb]			
3.8.	Max. rope speed [m/s or ft/min]			
3.9.	Max. suspended rope length [m or ft]			
3.10.	Current average rope life in cycles and years			

Mandatory information Important additional information

WE LEAVE NOTHING TO CHANCE

People's safety - and sometimes even their lives - depend on the reliability of steel wire ropes. For the selection of a high performance steel wire rope, reliable specifications such as breaking force, rotating characteristics, service life, spooling characteristics as well as discard criteria are key for multi- and single-layer spooling use. Each parameter has a direct impact on the total operating costs.

Therefore, we at Teufelberger-Redaelli consider all conceivable aspects like design, environment, hoist parameters, as well as specific applications right from the start when developing a rope. Using one-of-a-kind and state-of-the-art systems for testing and analyzing allows us to thoroughly examine every detail of the rope. This is how we develop premium high performance steel wire ropes excelling in each specific application.

- ✔ Precise planning: CAD
- ✔ Service life under scrutiny: bending fatigue testing machines
- ✔ Turning the inside out: the MRT-method (Magnetic Rope Testing)
- ✔ Precision with a big impact: electronic measuring equipment for efficiency testing
- ✔ Determining breaking forces and analyzing torsional behavior: tensile testing machines

Excelling through partnerships

Intensive partnerships with a sizable number of key users are clear examples of our focus on our customers' needs. Also, our long-standing cooperation with universities and research institutions ensures the lively exchange of ideas and proactive approach toward the development of new and existing products.

Rope end terminations subjected to endurance testing: dynamic fatigue tests and tensile testing machines

By means of dynamic fatigue tests and tensile testing machines, we analyze the influence of rope end terminations on the breaking forces of our high performance steel wire ropes. Our unique technical equipment allows us to carry out tests up to 3000 kN. Only suitable and correctly mounted rope end terminations make a rope complete. The information obtained ensures that the different rope types manufactured by Teufelberger-Redaelli work safely and reliably in combination with the right termination.

SERVICES ALONG THE WAY - WE GLADLY SHARE OUR EXPERTISE

The quality of the right solution is not only driven by the technical features of the high performance wire rope itself, but also the services that come along with it. Teufelberger-Redaelli is committed to supporting you right from the beginning, when you are looking for the optimal solution, by providing calculations and technical advice to ensure that the rope meets the technical parameters and ideally complements your entire hoisting system.

Teufelberger-Redaelli's network of experts provides competent support close to you. We share our expertise during installation, but also when maintenance work is necessary.

We are your competent service partner and will provide you with help and answers within 24 hours: +43 (0) 7242 615 388

WE ARE MORE THAN JUST ROPES –
please consider us an extension of your own wire rope team. Therefore, do not hesitate to contact us any time for free-of-charge support and advice. wireropes@teufelberger.com

Theoretical and hands-on training

Your everyday challenge is to ensure the smooth performance of your equipment at predictable costs. More than 230 years of experience in the manufacture, installation and inspection of ropes have made Teufelberger-Redaelli what it is today - the best in rope handling.

In a concise, yet comprehensive training, our experienced field engineers will share their expertise with you. Our training sessions, are vivid lessons with both theoretical and practical content. The skills you can develop in this training are, e.g.:

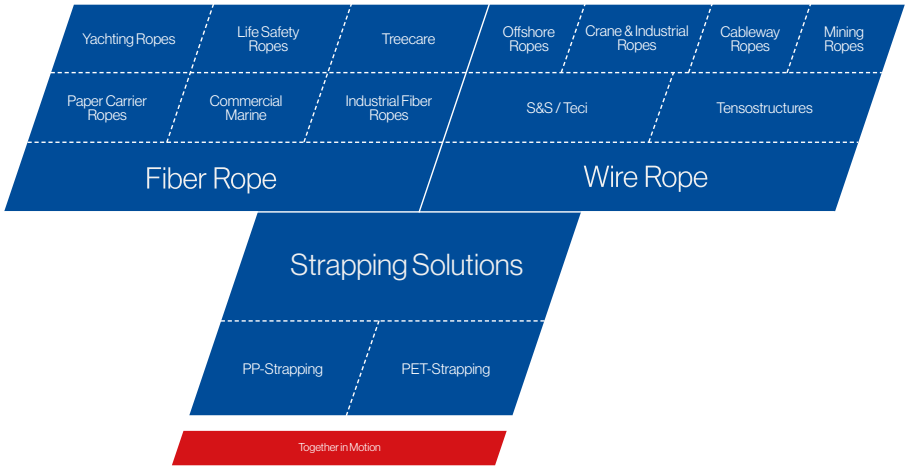
- Understanding different rope types and constructions so as to be able to make an informed and calculated decision when choosing the most suitable rope for a given application
- Profound knowledge about the proper installation of ropes
- Recognizing when a rope has to be discarded according to ISO 4309 and other acceptable standards
- Knowing how to store a rope appropriately
- Improving your rope handling experience through practical lessons
- Socketing training
- Key insights with regard to multi-layer spooling
- Troubleshooting according to your operational and maintenance needs

EXPERTISE FROM MORE THAN 230 YEARS OF EXPERIENCE

What started back in 1790 as a simple shop making hemp ropes has since evolved into a globally successful group of enterprises specializing in the development and production of fiber and steel wire ropes as well as strapping.

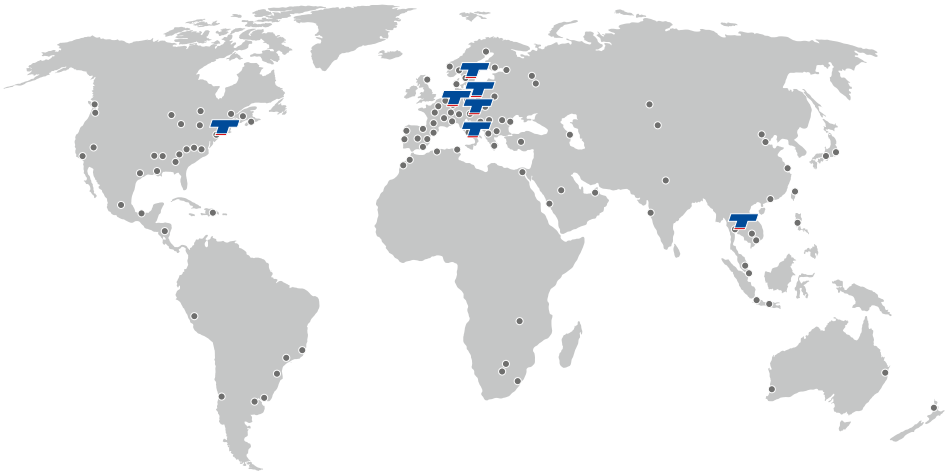
Great diversity

TEUFELBERGER's products and services are destined for a wide variety of applications ranging from cranes and marine applications to packaging and through to personal protection. The continuity and stability of a family enterprise makes us a reliable partner who, competently and effectively, supports you in mastering your day-to-day challenges.



Global presence and customer proximity

Manufacturing operations in various countries allow us to meet local quality and certification standards as well as customer requirements without difficulty. From our sites in Austria, the Czech Republic, the U.S., Italy, Sweden, and Thailand, and backed by a close-knit global network of distribution partners, we continue to satisfy the expectations of our customers.



Innovative solutions through synergies

TEUFELBERGER is a leading specialist for fiber and steel wire ropes as well as strapping. The spectrum of technologies in TEUFELBERGER's portfolio generates various synergies between the extrusion of thermoplastics, the braiding of high performance fibers, and the processing of wires into ropes and strapping.

Especially fiber and steel wire products have brought about valuable synergies with regard to both application and manufacturing technologies, which have benefited our customers tremendously. This makes TEUFELBERGER your ideal partner right from the project planning phase.

5 % of TEUFELBERGER's employees are active in research and development and make sure that our customers have access to the latest innovative rope technologies. 10 % of the entire investment volume is committed to development and quality assurance.

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