

# CONSTRUCTION

TAL

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High performance steel wire ropes



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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.

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## 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 develop and produce high performance steel wire ropes that create added value by enhancing the efficiency and safety of your applications. Expect more: of our innovative steel wire ropes, our services, our experienced experts in development, application engineering, and sales – all around the globe. Being a family enterprise, we attach great importance to 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 accompany you throughout your work processes when it comes to optimizing efficiency and costs.

### 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 crane systems have been set up optimally and if the ropes have been installed correctly. Therefore, we also provide support during project planning, installation, and subsequent careful handling to maximize rope lifetimes. For our structural cable systems we provide site installation and tensioning, inspection and maintenance. After all, the purchasing costs are just the tip of the iceberg.

### Application-specific, field-proven expertise and product portfolio

At Teufelberger-Redaelli you don't need to worry about making the right choices, as we can handle that for you. Our specialists know what matters in connection with your application and are therefore able to provide you with a clear 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
- cranes in offshore and onshore oil & gas exploration
- mining
- ropeways for the transport of passengers and goods
- cable systems for the civil engineering tensile structures
- 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 resulting high degree of flexibility allows us to keep delivery times to a minimum.



# GETTING THE BEST TOTAL COST OF OWNERSHIP

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

Todays goods for lifting are heavier than ever. The lifting heights are getting higher, which poses a huge challenge not only for the cranes, but even more so for wire ropes. Teufelberger-Redaelli high-performance steel wire ropes support the cranes and deep foundation machines with maximum flexibility and best efficiency for smooth and long-term operation.

Using the right quality of wire ropes in operation saves money by reducing your operational costs. Any machine down-time increases inefficiency. Therefore the investment in a Teufelberger-Redaelli high-performance steel wire rope pays off. Every day!

#### What matters most? Know your costs along the way Higher efficiency The initial purchasing costs for wire ropes are just the tip of the iceberg. Reduced costs 1 High wear resistance V High resistance to shock loads V Robustness against twisting V Fast availability 1 Safety in use Inital purchasing costs for wire rope Visible costs Downtime costs Penalties because of unpredicted rope failures Maintenance costs Invisible costs for crane components Costs for re-lubrication Logistics costs Personnel costs External expert costs

# TECHNOLOGY - THE BASIS OF FLAWLESS PERFORMANCE

In manufacturing, research & development, as well as marketing & sales, Teufelberger-Redaelli focuses exclusively on highquality special purpose steel wire ropes. Breakthrough technologies and top quality products form the basis for a long lasting, successful relationship. The following short summary gives you a glimpse of our in-depth 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 the permanent lubrication and the reduction of friction between the rope's core and its outer strands
- Resistance to compression and lateral pressure as well as to environmental influences and the ingress of dirt
- Higher breaking forces due to reduced surface pressures in the rope
- Reduced internal abrasion thanks to the exact positioning of strands with consistent clearances between them

#### SUPERFILL® COMPACTION TECHNOLOGY

Each rope strand is compacted by a special process, which significantly improves the rope's properties:

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

#### GALVANIZED WIRES

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

#### **ACTIVE** CORE LUBRICATION

Special temperature-resistant 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 of the rope core

#### DUOFILL® COMPACTION TECHNOLOGY

DUOFILL<sup>®</sup> is a special double compaction technology, developed by Teufelberger-Redaelli. Each individual rope strand as well as the entire rope itself are compacted by a special manufacturing process in order to achieve the following advantages:

- Highest breaking strength due to maximum compaction
- Improved service life for multilayer applications with extreme line pulls due to the very smooth surface
- Advanced resistance against crushing due to high dimensional stability



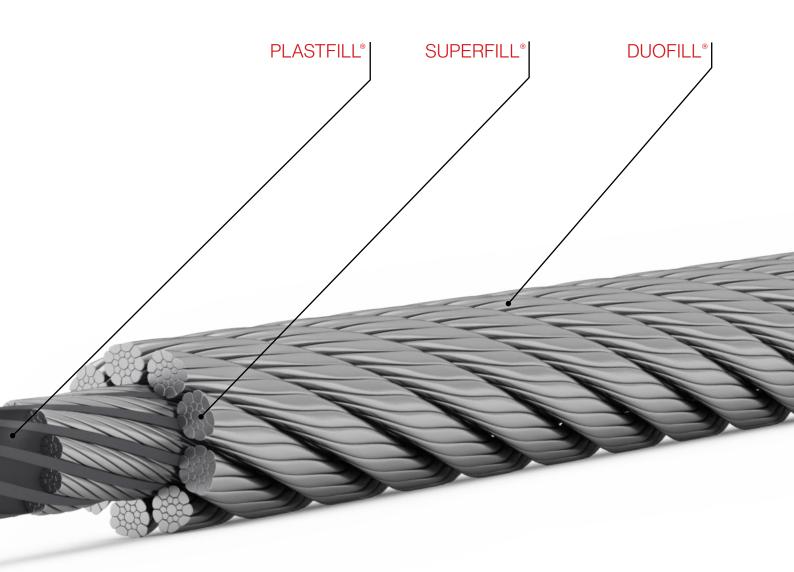
# Our references convince!

Our high-performance steel wire ropes are worldwide in action.



### Our technologies. Your benefit.

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



# High-performance wire ropes at a glance

Crane type	Application	Ropes		
		EVOLUTION TK27	EVOLUTION TK17	FLEXPACK®
All Terrain & Mobile Crane				
	Hoist rope	Х	Х	Х
Crawler Crane	Hoist rope	Х	Х	Х
	Boom hoist rope			
Tower Crane	Hoist rope	Х	Х	Х
	Boom hoist rope Trolley rope			
Rotary Drilling Rigs	Kelly rope Auxilary hoist rope			
	Crowd rope			
Duty Cycle Crawler	Hoist rope	Х	Х	Х
3	Boom hoist rope			
Piling Rigs	Kelly rope Auxilary hoist rope			

EVOLUTION TK16/TK18	FLEXPACK® P	EVOLUTION P9	EVOLUTION QS816V	PACK <sup>®</sup> 1P	PACK <sup>®</sup> 9P
		Х	Х	Х	Х
			Х	Х	X
Х	Х				
		Х	Х	Х	X
Х	Х				
		Х	Х	Х	X
Х	Х				

# **EVOLUTION TK27**

The new high-end hoisting rope for extreme breaking forces at rope grade 1960. Its new rope construction incorporates all the required characteristics for using a hoisting rope in multilayer spooling and with extreme lifting heights.

#### UNBEATABLE BREAKING FORCE

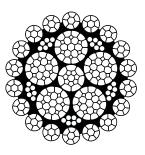
#### Specifications

- Lang lay, right or left lay
- 21-42 mm: 18xK7-IWRC(K), RCN 23-3
- ✓ Multilayer Spooling
- ✓ SUPERFILL<sup>®</sup>
- × PLASTFILL

#### **Benefits**

- Reliability and safety during operation: unbeatable high breaking forces achieved through the innovative rope design featuring compacted strands and a compacted core
- Less abrasion: highest degree of compaction in the market
- Smooth, easy installation and reeving: due to high flexibility
- Extremely rotation-resistant even at enormous lifting heights: ensured by its balanced construction





#### Technical data

Construction	Nominal	Ø	Weight		Minimum breaki 1960	ng forces at rope grade
	mm	inch	kg/m	lbs/ft	kN	lbf
	16	5/8	1.31	0.88	268	60,249
18xK6-IWRC(K)	18		1.66	1.12	339	76,210
	19	3/4	1.85	1.24	378	84,978
	21		2.26	1.52	462	103,862
	22	7/8	2.48	1.66	507	113,978
	23		2.71	1.82	554	124,544
	24		2.95	1.98	603	135,560
	25		3.21	2.15	654	147,025
	25.4	1	3.31	2.22	675	151,746
	26		3.47	2.33	708	159,165
18xK7-IWRC(K)	28		4.02	2.70	821	184,568
	28.57	1 1/8	4.19	2.81	854	191,987
	30		4.62	3.10	942	211,770
	32	1 1/4	5.25	3.52	1,072	240,995
	34		5.93	3.98	1,210	272,019
	36		6.65	4.46	1,357	305,066
	38	1 1/2	7.41	4.97	1,512	339,911
	40		8.21	5.51	1,675	376,555
	42		9.05	6.07	1,812	407,354

Other rope diameters are available on request.

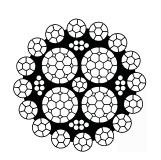
# **EVOLUTION TK17**

EVOLUTION TK17 features - due to its structure - optimum all-round characteristics combined with extremely high breaking forces. EVOLUTION TK17 was designed specifically for use in challenging multilayer spooling conditions, especially also for small drum diameters.

#### OUTSTANDING SPOOLING EFFICIENCY

#### Specifications

- Lang lay, right or left lay
- 10-30 mm: 16xK6-IWRC(K), RCN 23-1
- 32-34 mm: 16xK7-IWRC(K), RCN 23-2 \_
- Multilayer Spooling V
- SUPERFILL<sup>®</sup>
- PLASTFILL® x



#### **Benefits**

- Outstanding spooling efficiency: because of extremely tight diameter tolerances
- Well-established in the market: OEM approved for years
- Ideal in multilayer operations: rope-construction provides excellent service life especially for small D/d ratios
- Flexibility and efficency: ungalvanized wire material

#### Technical data

Construction	Nominal Ø		Weight	:	Minimum 1770	breaking force	<b>s at rope gra</b> 1960	de	2160	
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf
	10		0.48	0.32	82	18,434	94	21,132	98	22,031
	11		0.61	0.41	100	22,481	111	24,954	118	26,527
	12		0.72	0.48	120	26,977	133	29,900	144	32,372
	13		0.86	0.58	141	31,698	156	35,070	170	38,218
	14	9/16	0.97	0.65	163	36,644	181	40,690	197	44,287
	15		1.11	0.75	188	42,264	208	46,760	226	50,807
	16	5/8	1.26	0.85	214	48,109	236	53,055	257	57,776
	17		1.42	0.95	241	54,179	267	60,024	290	65,195
	18		1.61	1.08	271	60,923	300	67,443	325	73,063
	19	3/4	1.78	1.20	302	67,892	334	75,086	362	81,381
	20		2.02	1.36	338	75,985	374	84,079	401	90,148
16xK6-IWRC(K)	21		2.23	1.50	373	83,854	413	92,846	444	99,815
	22	7/8	2.44	1.64	408	91,722	452	101,614	487	109,482
	23		2.62	1.76	445	100,040	493	110,831	533	119,823
	24		2.83	1.90	483	108,583	535	120,273	580	130,389
	25		3.11	2.09	524	117,800	580	130,389	624	140,281
	25.4	1	3.20	2.15	527	118,474	584	131,288	638	143,428
	26		3.34	2.24	567	127,467	627	140,955	675	151,746
	27		3.58	2.41	609	136,909	674	151,521	725	162,986
	28		3.89	2.61	655	147,250	725	162,986	780	175,351
	28.57	1 1/8	3.91	2.63	659	148,149	730	164,111	785	176,475
	29		4.14	2.78	701	157,591	777	174,677	835	187,715
	30		4.49	3.02	749	168,382	830	186,591	893	200,754
16xK7-IWRC(K)	32	1 1/4	4.98	3.35	852	191,537	944	212,220	1,016	228,406
10XN/-IWKU(N)	34		5.62	3.78	958	215,367	1,061	238,522	1,141	256,507

Other rope diameters are available on request.

# **FLEXPACK<sup>®</sup>**

Winning the world record in 2017 for being the heaviest rope ever produced, the FLEXPACK® has to be considered the best 35 x 7 construction for your application.

#### WORLDS BEST 35 X 7 WIRE ROPE

#### Specifications

- Ordinary lay, lang lay, right or left lay
- 12-13 mm: 27(W)xK7, RCN 23-2
- 14-40 mm: 34(W)xK7, RCN 23-2
- 41-46 mm: 39(W)xK7-WSC, RCN 23-3

#### **Benefits**

- High wear resistance: resulting from large wire diameter \_
- Reliable and safe in use: proven rope construction taken to abso-\_ lute allround perfection
- One wire rope fits all: short-term availability for various applications

153,892

165,503

172,370

177,536

189,990

685

736

767

790

845

700

753

784

808

864

157,362

169,235

176.257

181,539

194,275

Consistant quality control: made in Europe



#### Technical data

27

28

29

30

28.58

1 1/8

3.66

3.93

4.10

4.22

4.51

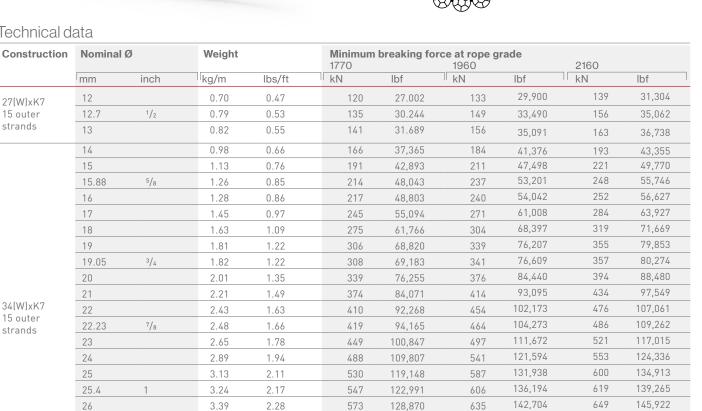
2.46

2.64

2.75

2.83

3.03



618

665

692

713

763

138,974

149,459

155,661

160,325

171,573



"FLEXPACK<sup>®</sup> has been awarded three times to the Guinness World Records for the heaviest rope manufactured. The last time in 2017 with a weight of 488.366 metric tonnes (1,076,662.73 lb)." Davide Cologna - Head of Applications Technology

Construction	Nominal	Ø	Weight		Minimum 1770	breaking fo	orce at rope g 1960	rade	2160		
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	
	31		4.82	3.24	815	183,202	902	202,868			
	31.75	1 1/4	5.06	3.40	855	192,174	947	212,803			
	32		5.14	3.45	868	195,212	962	216,167			
	33		5.46	3.67	923	207,603	1,023	229,889			
	34		5.80	3.90	980	220,376	1,086	244,032			
34(W)xK7	34.93	1 <sup>3</sup> /8	6.12	4.11	1,034	232,530	1,145	257,491			
15 outer	35		6.14	4.13	1,039	233,530	1,150	258,598			
	36		6.50	4.37	1,099	247,065	1,217	273,586			
	37		6.87	4.61	1,161	260,982	1,286	288,997			
	38		7.24	4.87	1,225	275,279	1,356	304,829			
	38.1	1 1/2	7.28	4.89	1,231	276,730	1,363	306,436	On spe	cial request.	
	39		7.63	5.13	1,290	289,958	1,428	321,084			
	40		8.03	5.39	1,357	305,019	1,502	337,761			
	41		8.18	5.50	1,379	309,953	1,527	343,225			
	41.28	1 5/8	8.29	5.57	1,397	314,125	1,547	347,845			
	42		8.58	5.77	1,447	325,258	1,602	360,172			
39(W)xK7-WSC	43		9.00	6.05	1,517	340,930	1,679	377,527			
18 outer strands	44		9.42	6.33	1,588	356,972	1,758	395,291			
	44.45	1 3/4	9.62	6.46	1,621	364,311	1,794	403,418			
	45		9.86	6.62	1,661	373,382	1,839	413,463			
	46		10.30	6.92	1,736	390,161	1,922	432,043			

# **EVOLUTION TK16**

A manufacturing process developed and refined down to the most minute detail transforms highest-quality raw materials into the EVOLUTION TK16. You will love this rope for its high flexibility and extreme durability.

#### EXTREME PROTECTION AGAINST EXTERNAL INFLUENCES

#### Specifications

- Ordinary lay or lang lay, right or left lay
- 8-30 mm: 16xK6-EPIWRC(K), RCN 23-1
- 32-42 mm: 16xK7-EPIWRC(K), RCN 23-2

#### ✔ Multilayer Spooling

- ✓ SUPERFILL<sup>®</sup>
- ✓ PLASTFILL<sup>®</sup>

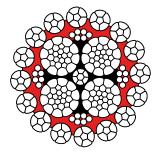


#### Technical data

#### Perfect discard recognition and reduced internal wire breakes: thanks to permanent lubrication Excellent winding behavior: auf Excellent spooling behavior

**Benefits** 

 Perfect protection against damages: independent plastified steel core



Construction	Nominal Ø		Weight	Weight		Minimum breaking force at rope grade177019602160					
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	
	8	5/16	0.33	0.22	56	12,589	62	13,938	64	14,388	
	9		0.40	0.27	71	15,961	79	17,760	81	18,210	
	10		0.50	0.34	88	19,783	97	21,806	100	22,481	
	11	7/16	0.61	0.41	106	23,830	117	26,303	121	27,202	
	12		0.74	0.50	126	28,326	140	31,473	144	32,372	
	12.70	1/2	0.83	0.56	142	31,923	157	35,295	162	36,419	
	13		0.86	0.58	148	33,272	164	36,869	170	38,218	
	14	9/16	1.01	0.68	172	38,667	190	42,714	197	44,287	
	15		1.16	0.78	197	44,287	218	49,008	231	51,931	
	16	5/8	1.28	0.86	224	50,357	250	56,202	263	59,125	
	17		1.44	0.97	253	56,877	280	62,947	290	65,195	
	18		1.64	1.10	284	63,846	314	70,590	333	74,861	
6xK6-	19	3/4	1.85	1.24	316	71,040	350	78,683	371	83,404	
PIWRC(K)	20		2.08	1.40	350	78,683	388	87,226	401	90,148	
	21		2.20	1.48	387	87,001	428	96,218	444	99,815	
	22		2.49	1.67	424	95,319	469	105,435	487	109,482	
	22.23	7/8	2.54	1.71	433	97,342	479	107,683	495	111,280	
	23		2.72	1.83	463	104,087	513	115,327	530	119,149	
	24		2.94	1.98	505	113,529	559	125,668	580	130,389	
	25		3.15	2.12	546	122,746	605	136,009	639	143,653	
	25.40	1	3.21	2.16	565	127,017	626	140,730	644	144,777	
	26		3.44	2.31	592	133,087	656	147,475	675	151,746	
	27		3.65	2.45	638	143,428	707	158,940	725	162,986	
	28		4.05	2.72	686	154,219	760	170,855	780	175,351	
	28.57	1 1/8	4.04	2.71	715	160,738	792	178,049	814	182,994	
	29		4.27	2.87	737	165,684	816	183,444	835	187,715	
	30		4.62	3.10	788	177,149	873	196,258	893	200,754	

Construction	Nominal	Ø	Weight		Minimum 1770	breaking for	r <b>ce at rope g</b> 1960	rade	2160	2160		
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf		
	31,75	1 1/4	5.02	3.37	883	198.506	978	219,863	1,010	227,057		
	32		5.10	3.43	897	201.654	993	223,235	1,035	232,677		
	34		5.74	3.86	1,012	227,507	1,121	252,011	1,141	256,507		
16xK7-	35	1 3/8	6.08	4.09	1,073	241,220	1,188	267,073	1,210	272,019		
EPIWRC(K)	36		6.41	4.31	1,135	255,158	1,257	282,585	1,277	287,081		
	38	1 1/2	7.19	4.83	1,236	277,864	1,369	307,763	1,472	330,919		
	40		7.87	5.29	1,370	307,988	1,517	341,035	1,568	352,500		
	42		8.83	5.93	1,510	339,462	1,672	375,881	1,729	388,695		

#### Technical data EVOLUTION TK16

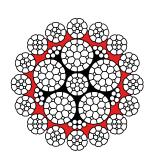
# **EVOLUTION TK18**

EVOLUTION TK18 is our high-performance rope for deep foundation equipment, mainly for brutally harsh conditions. This rope offers excellent dimensional stability, high resistance to corrosion, and ideal lubrication, especially due to its Active Core Lubrication in combination with a PLASTFILL<sup>®</sup> insert. EVOLUTION TK18 is your best choice.

#### HIGHEST CRUSHING RESISTANCE

#### Specifications

- Ordinary lay or lang lay, right or left lay
- 16xK17F-EPIWRC(K), RCN 27
- Multilayer Spooling
- ✓ SUPERFILL<sup>®</sup>
- ✓ PLASTFILL<sup>®</sup>



#### Benefits

- Equal distribution of tension: inner balanced core design
- Suitable for heavy loads: rope design starting from 44 mm
- Resistance against shock loads: due to PLASTFILL<sup>®</sup> technology and core design

#### Technical data

Construction	Nominal Ø		Weight		Minimum bre	eaking forces a	at rope grade		
					1770		1960		2160
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf	
	44		9.31	6.26	1,607	361,268	1,779	399,935	
	44.45	1 3/4	9.48	6.37	1,641	368,911	1,817	408,478	
	46		10.24	6.88	1,758	395,214	1,960	440,626	
	48		11.12	7.47	1,914	430,284	2,119	476,370	
16xK17F-	50		12.40	8.33	2,076	466,703	2,299	516,836	On special
EPIWRC(K)	50.80	2	12.98	8.72	2,143	481,766	2,374	533,696	request.
	52		13.61	9.15	2,246	504,921	2,487	559,100	
	54	2 <sup>1</sup> /8	14.48	9.73	2,422	544,487	2,682	602,938	
	56		15.28	10.27	2,605	585,627	2,884	648,349	

Other rope diameters are available on request.

# FLEXPACK® P

Based on the world record rope & manufactured with an additional plastification the FLEXPACK<sup>®</sup> P is a 35 x 7 design with resistance against external influences.

#### BEST PROTECTED 35 X 7 WIRE ROPE

#### Specifications

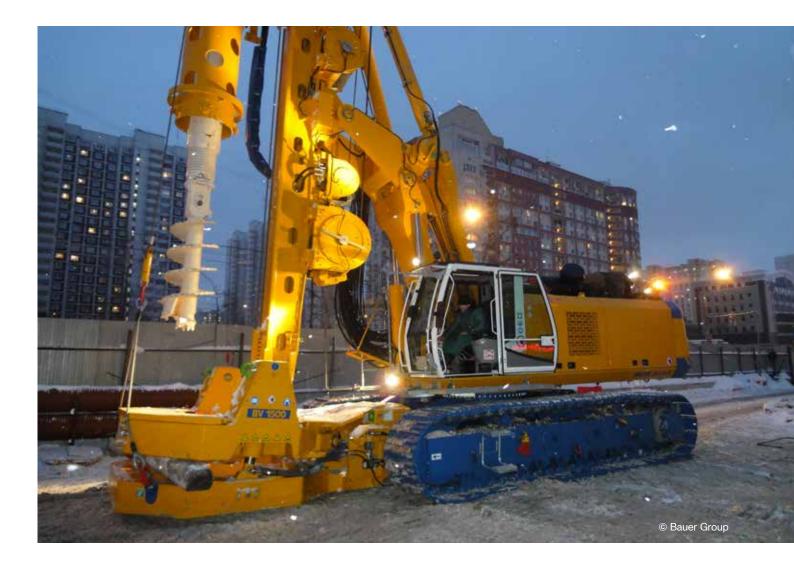
- Ordinary lay, lang lay, right or left lay
- 12-13 mm: 27(W)xK7, RCN 23-2
- 14-40 mm: 34(W)xK7, RCN 23-2
- 41-46 mm: 39(W)xK7-WSC, RCN 23-3

#### Benefits

- Trouble-free operation: due to the rope's very high resistance to vibrations
- Easy handling: PLASTFILL<sup>®</sup> technology makes the rope extremly resistant against high fleet angles
- High wear resistance: resulting from large wire diameter



Construction	Nominal	Ø	Weight		Minimum 1770	breaking fo	orce at rope g 1960	rade	2160	
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf
27(W)xK7	12		0.70	0.47	120	27.002	133	29,900	139	31,304
15 outer	12.7	1/2	0.79	0.53	135	30.244	149	33,490	156	35,062
strands	13		0.82	0.55	141	31.689	156	35,091	163	36,738
	14		0.98	0.66	166	37,365	184	41,376	193	43,355
	15		1.13	0.76	191	42,893	211	47,498	221	49,770
	15.88	5/8	1.26	0.85	214	48,043	237	53,201	248	55,746
	16		1.28	0.86	217	48,803	240	54,042	252	56,627
	17		1.45	0.97	245	55,094	271	61,008	284	63,927
	18		1.63	1.09	275	61,766	304	68,397	319	71,669
	19		1.81	1.22	306	68,820	339	76,207	355	79,853
	19.05	3/4	1.82	1.22	308	69,183	341	76,609	357	80,274
	20		2.01	1.35	339	76,255	376	84,440	394	88,480
	21		2.21	1.49	374	84,071	414	93,095	434	97,549
34(W)xK7	22		2.43	1.63	410	92,268	454	102,173	476	107,061
15 outer strands	22.23	7/8	2.48	1.66	419	94,165	464	104,273	486	109,262
otranao	23		2.65	1.78	449	100,847	497	111,672	521	117,015
	24		2.89	1.94	488	109,807	541	121,594	553	124,336
	25		3.13	2.11	530	119,148	587	131,938	600	134,913
	25.4	1	3.24	2.17	547	122,991	606	136,194	619	139,265
	26		3.39	2.28	573	128,870	635	142,704	649	145,922
	27		3.66	2.46	618	138,974	685	153,892	700	157,362
	28		3.93	2.64	665	149,459	736	165,503	753	169,235
	28.58	1 1/8	4.10	2.75	692	155,661	767	172,370	784	176,257
	29		4.22	2.83	713	160,325	790	177,536	808	181,539
	30		4.51	3.03	763	171,573	845	189,990	864	194,275



Construction	Nominal	Ø	Weight		Minimum 1770	breaking fo	orce at rope g 1960	rade	2160		
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf	
	31		4.82	3.24	815	183,202	902	202,868			
	31.75	1 1/4	5.06	3.40	855	192,174	947	212,803			
	32		5.14	3.45	868	195,212	962	216,167			
	33		5.46	3.67	923	207,603	1,023	229,889			
	34		5.80	3.90	980	220,376	1,086	244,032			
34(W)xK7	34.93	1 3/8	6.12	4.11	1,034	232,530	1,145	257,491			
15 outer	35		6.14	4.13	1,039	233,530	1,150	258,598			
strands	36		6.50	4.37	1,099	247,065	1,217	273,586			
	37		6.87	4.61	1,161	260,982	1,286	288,997			
	38		7.24	4.87	1,225	275,279	1,356	304,829			
	38.1	1 1/2	7.28	4.89	1,231	276,730	1,363	306,436	On spe	cial request.	
	39		7.63	5.13	1,290	289,958	1,428	321,084			
	40		8.03	5.39	1,357	305,019	1,502	337,761			
	41		8.18	5.50	1,379	309,953	1,527	343,225			
	41.28	1 5/8	8.29	5.57	1,397	314,125	1,547	347,845			
	42		8.58	5.77	1,447	325,258	1,602	360,172			
39(W)xK7-WSC	43		9.00	6.05	1,517	340,930	1,679	377,527			
18 outer strands	44		9.42	6.33	1,588	356,972	1,758	395,291			
0.1.4.1.4.0	44.45	1 3/4	9.62	6.46	1,621	364,311	1,794	403,418			
	45		9.86	6.62	1,661	373,382	1,839	413,463			
	46		10.30	6.92	1,736	390,161	1,922	432,043			

# **EVOLUTION QS816V**

Extreme resistance to negative external influences distinguishes this rope from others. It features Teufelberger-Redaelli's proprietary SUPERFILL® compaction technology which ensures high breaking forces and maximum safety in use. Its compacted inner core and a PLASTFILL® insert give the rope high dimensional stability under lateral pressure. The EVOLUTION QS816V is the strongest 8-strand rope in the Teufelberger-Redaelli product portfolio.

#### ULTIMATE BREAKING FORCES

#### Specifications

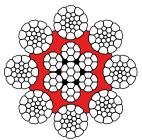
- Ordinary lay or lang lay, right or left lay
- 8xK26WS-EPIWRC(K), RCN 09
- Use without swivel
- Special construction of inner core
- ✔ Multilayer Spooling

Technical data

- SUPERFILL®
- ✓ PLASTFILL<sup>®</sup>

#### **Benefits**

- Excellent spooling: enabeld by tightest diameter tolerances also for complex reeving systems
- Reliability and safety during operation: high breaking forces and high safety factor
- Less abrasion: highest degree of SUPERFILL<sup>®</sup> compaction in the market
- Improved permanent lubrication: PLASTFILL<sup>®</sup> impregnation leads to less wear in the core



Construction	Nomina	al Ø	Weight		Minimum b	preaking forc	es at rope grad	е		
					1770		1960		2160	
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf	kN	lbf
	10		0.47	0.32	83.4	18,749	92.4	20,772	100	22,481
	11	7/16	0.56	0.38	101	22,706	112	25,179	121	27,202
	12		0.68	0.46	120	26,977	133	29,900	144	32,372
	13		0.81	0.54	141	31,698	156	35,070	172	38,667
	14	9/16	0.93	0.62	163	36,644	181	40,690	198	44,512
	15		1.05	0.71	188	42,264	208	46,760	226	50,807
	16	5/8	1.21	0.81	214	48,109	236	53,055	256	57,551
	17		1.37	0.92	241	54,179	267	60,024	289	64,970
	18		1.55	1.04	270	60,698	299	67,218	324	72,838
	19	3/4	1.69	1.14	302	67,892	335	75,311	369	82,955
	20		1.86	1.25	334	75,086	369	82,955	402	90,373
	21		2.06	1.38	374	84,079	414	93,071	449	100,939
8xK26WS-	22	7/8	2.34	1.57	408	91,722	451	101,389	497	111,730
EPIWRC(K)	23		2.55	1.71	445	100,040	492	110,606	543	122,071
EPIWRU(K)	24		2.75	1.85	480	107,908	532	119,598	577	129,715
	25	1	2.98	2.00	521	117,125	577	129,715	633	142,304
	26		3.23	2.17	564	126,792	624	140,281	678	152,420
	27		3.40	2.28	608	136,684	673	151,296	730	164,111
	28		3.76	2.53	656	147,475	726	163,211	800	179,847
	28.58	1 1/8	3.81	2.56	681	153,095	754	169,506	820	184,343
	29		3.92	2.63	701	157,591	777	174,677	847	190,413
	30		4.36	2.93	764	171,754	846	190,188	901	202,553
	32	1 1/4	4.93	3.31	864	194,235	957	215,142	1,042	234,251
	34		5.55	3.73	964	216,716	1,068	240,096	1,157	260,104
	36		6.27	4.21	1,081	243,018	1,197	269,096	1,297	291,577
	38	1 1/2	6.99	4.70	1,222	274,717	1,354	304,391	1,445	324,849
	40		7.80	5.24	1,342	301,694	1,486	334,066	1,601	359,919

Other rope diameters are available on request.



# **EVOLUTION P9**

Highest resistance to crushing and deformation! EVOLUTION P9 – the high-performance boom hoist rope impresses with highest dimensional stability and breaking forces with maximum flexibility. The innovative 9-strand construction with the Teufelberger-Redaelli compaction technology DUOFILL® makes the difference.

#### EXTREME CRUSHING RESISTANCE

#### Specifications

- Ordinary lay, right or left lay
- K9xK19S-PWRC(K), RCN 05, ungalvanized
- Use without swivel

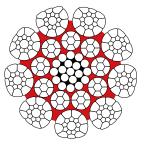
#### Multilayer Spooling

- ✓ SUPERFILL<sup>®</sup>
- ✓ PLASTFILL<sup>®</sup>
- ✔ DUOFILL<sup>®</sup>

#### **Benefits**

- Highest crushing resistance: enabled by DUOFILL<sup>®</sup> compaction technology
- Perfect for multilayer spooling: 9-strand construction ensures round and smooth surface.
- Increased safety: DUOFILL<sup>®</sup> compaction leads to highest breaking forces.





#### Technical data

Construction	Nominal Ø		Weight	Weight		Minimum breaking forces at rope grade				
					1960		2160			
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf		
	16	5/8	1.45	0.97	268	60,249	284	63,846		
	18		1.84	1.24	339	76,210	359	80,706		
	19	3/4	2.05	1.38	378	84,978	400	89,924		
	20		2.11	1.42	419	94,195	443	99,590		
	22		2.74	1.84	507	113,978	536	120,498		
	22.22	7/8	2.80	1.88	517	116,226	547	122,970		
	24		3.27	2.20	603	135,560	638	143,428		
K9xK19S-	25		3.54	2.38	654	147,025	693	155,793		
PWRC(K)	25.40	1	3.28	2.20	675	151,746	715	160,738		
	26		3.83	2.57	708	159,165	749	168,382		
	28		4.01	2.69	822	184,793	869	195,359		
	28.57	1 1/8	4.12	2.77	854	191,987	905	203,452		
	30		4.54	3.05	942	211,770	998	224,359		
	31.75	1 1/4	5.01	3.37	1,055	237,173	1,117	251,112		
	32		5.09	3.42	1,072	240,995	1,135	255,158		

Other rope diameters are available on request.

## PACK<sup>®</sup> 1P

Flexibility, resistance to mechanical wear and high breaking force: these are the qualities a compacted 6-strand wire rope with plastified steel core must possess. This 6-strand rope with SUPERFILL® compaction technology and a PLASTFILL® insert combines all these characteristics for your smooth operation.

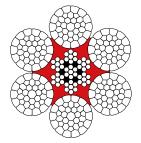
#### SIMPLY STRONG

#### Specifications

- Ordinary lay, right or left lay
- 16-23 mm: 6xK26WS-EPIWRC, RCN 06
- 24-40 mm: 6xK31WS-EPIWRC, RCN 08
- Use without rope swivel
- ✓ SUPERFILL<sup>®</sup>
- ✓ PLASTFILL<sup>®</sup>

#### Benefits

- Consistent product quality: state of the art manufacturing standard
- Reduced wear of sheaves and drums: due to internal and external lubrication
- Comparatively high breaking force: SUPERFILL® technology increases metallic cross section
- Reduced internal wear: PLASTFILL<sup>®</sup> technology protects steel core





Construction	Nominal (	ð	Weight	Weight		Minimum breaking forces at rope grade				
						1960		2160		
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf		
	16		1.18	0,79	213	47,840	235	52,722		
	18		1.49	1.00	269	60,548	297	66,726		
6xK26WS-	19	3/4	1.66	1.11	300	67,462	331	74,346		
EPIWRC	20		1.84	1.23	333	74,750	366	82,378		
	22		2.22	1.49	402	90,448	443	99,677		
	22.23	7/8	2.27	1.52	411	92,307	453	101,727		
	24		2.68	1.80	479	107,641	528	118,624		
	25.40	1	3.01	2.02	536	120,565	591	132,867		
	26		3.15	2.12	562	126,328	619	139,219		
	28		3.65	2.45	634	142,441	698	156,976		
	28.58	1 1/8	3.81	2.56	660	148,351	727	163,489		
6xK31WS-	30		4.19	2.82	727	163,516	802	180,202		
EPIWRC	31.75	1 1/4	4.70	3.16	815	183,150	898	201,838		
	32		4.77	3.21	828	186,045	912	205,030		
	34		5.39	3.62	934	210,028	1,030	231,459		
	36		6.04	4.06	1,047	235,464	1,154	259,491		
	38	1 1/2	6.73	4.52	1,167	262,353	1,286	289,124		
	40		7.46	5.01	1,293	290,696	1,425	320,359		

# PACK<sup>®</sup> 9P

The 9-strand design with it's plastification & compactation ensures highest resistance against wear. The rope has proven it's outstanding performance as a crowd rope on pilling rigs under harshest conditions.

#### MIGHTY STRONG ALLROUNDER

#### Specifications

- Ordinary or lang lay, right or left lay
- 9xK19S-EPIWRC(K), RCN 05
- Use without rope swivel

#### ✓ SUPERFILL<sup>®</sup>

✓ PLASTFILL<sup>®</sup>

#### Benefits

- Excellent wear resistance: enabled by 9-strand construction
- Good fleet angle resistance: due to PLASTFILL<sup>®</sup> technology
- Outstanding bending cycles: flexible rope design
- Less abrasion: supported by the rope's smooth surface



# (

Construction	Nominal Ø		Weight		<b>Minimum b</b> 1960	reaking force at rop	<b>e grade</b> 2160	
	mm	inch	kg/m	lbs/ft	kN	lbf	kN	lbf
	8		0.31	0.21	58	13,112	63	14,230
	9		0.40	0.27	74	16,595	80	18,010
	9.53	3/8	0.45	0.30	83	18,587	90	20,172
	10		0.49	0.33	91	20,487	99	22,234
	11		0.59	0.40	110	24,789	120	26,904
	12		0.71	0.47	131	29,501	142	32,018
	12.7	1/2	0.79	0.53	147	33,044	160	35,862
	13		0.83	0.56	154	34,623	167	37,576
	14		0.96	0.65	179	40,155	194	43,579
	15		1.10	0.74	205	46,096	223	50,027
xK19S-	15.88	5/8	1.24	0.83	230	51,631	249	56,034
EPIWRC(K)	16		1.26	0.84	233	52,447	253	56,920
	17		1.42	0.95	263	59,208	286	64,257
	18		1.59	1.07	295	66,378	320	72,040
	19		1.77	1.19	329	73,959	357	80,266
	19.05	3/4	1.78	1.20	331	74,348	359	80,689
	20		1.96	1.32	365	81,949	387	86,955
	21		2.16	1.45	402	90,348	426	95,867
	22		2.38	1.60	441	99,158	468	105,215
	22.23	7/8	2.42	1.63	450	101,196	478	107,378
	23		2.60	1.74	482	108,377	512	114,997
	24		2.83	1.90	525	118,006	557	125,214



Construction	Nominal Ø		Weight	Weight		Minimum breaking force at rope grade 1960 2160			
	mm	inch	kg/m	lbs/ft		kN	lbf	kN	lbf
	25		3.07	2.06		570	128,045	604	135,866
	25.4	1	3.17	2.13		588	132,175	624	140,249
	26		3.32	2.23		616	138,493	654	146,953
	27		3.58	2.40		664	149,351	705	158,475
	28		3.85	2.59		714	160,619	758	170,431
	28.58	1 1/8	4.01	2.69		744	167,284	790	177,503
	29		4.13	2.77		766	172,297		
	30		4.42	2.97		820	184,384		
	31		4.72	3.17		876	196,881		
	31.75	1 1/4	4.95	3.32		919	206,523		
9xK19S-	32		5.03	3.38		933	209,788		
EPIWRC(K)	33		5.34	3.59		992	223,105		
	34		5.67	3.81		1,053	236,831		
	34.93	1 3/8	5.99	4.02		1,112	249,893	On special	request.
	35		6.01	4.04		1,116	250,967		
	36		6.36	4.27		1,181	265,513		
	37		6.72	4.52		1,248	280,469		
	38		7.09	4.76		1,316	295,834		
	38.1	1 1/2	7.12	4.79		1,323	297,393		
	39		7.47	5.02		1,386	311,609		
	40		7.85	5.28		1,458	327,794		



## DISCARD CRITERIA

### The discard criteria for special steel wire ropes of Teufelberger-Redaelli are defined according to:

- ISO 4309

- API 2D FIFTH EDITION

This includes: reduction of rope diameter, corrosion, and wire breaks. For assessing the discard condition based on wire breaks, the rope category number (RCN) is used. For special steel wire ropes of Teufelberger-Redaelli, this number is listed in the following tables.

Type of design	Diameter range mm	RCN*	n**
EVOLUTION TK27	16 - 42	23-3	126
	10 - 30	23-1	96
EVOLUTION TK17	32 - 34	23-2	112
	12 - 40	23-2	105
FLEXPACK <sup>®</sup> & FLEXPACK <sup>®</sup> P	41 - 46	23-3	126
	8 - 30	23-1	96
EVOLUTION TK16	31 - 42	23-2	112
EVOLUTION TK18	44 - 56	27	272
EVOLUTION QS816V	10 - 40	09	208
EVOLUTION P9	16 - 32	05	171
	16 - 23	06	156
PACK <sup>®</sup> 1P	24 - 40	08	186
PACK <sup>®</sup> 9P	8 - 40	05	171

\* RCN = Rope Category Number, \*\*n = Total number of load-bearing wires in the outer layer of strands in the rope

### DETERMINING THE RIGHT POINT OF DISCARD WITH THE SIDIS APP

SIDIS (SImply DIScard) provides assistance in determining the current condition of a crane rope and calculates the level of wear according to the discard criteria stipulated in ISO 4309. This makes the app an ideal tool for inspectors, maintenance managers and all those who inspect steel wire ropes for companies.

#### Save time and costs with a quick and comfortable crane rope inspection:

- Quick entry of the required rope data
- Convenient inspection of all crane rope types by means of stored RCN numbers Teufelberger-Redaelli steel wire ropes can be added easily via a selection list
- Easy determination of the point of discard by means of traffic light system
- Support of your controlling department through rope-related evaluations
- Processing of rope evaluations by exporting the data as PDF or sending them by e-mail

### Download it for free now!











### 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, discard criteria, but also rotating characteristics, service life, and spooling characteristics are key for multilayer spooling use. Each parameter has a direct impact on the total operating costs.

If you notice certain behavior of a rope when using it on site, it will be too late. Therefore, we at Teufelberger-Redaelli consider all conceivable aspects such as design, ambient temperatures, reeving systems, 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. And our long-standing cooperation with universities and research institutions ensures the lively exchange of ideas 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 usually not only driven by the technical features of the high-performance wire rope itself, but also by the services that come with it. Teufelberger-Redaelli supports you right from the beginning when you are looking for the perfect solution by providing calculations and technical advice to make sure that the rope fits your entire crane system.

Teufelberger-Redaelli's network of experts provides you with competent support. We share our expertise during installation, as well as when maintenance work is necessary.

### We are your competent service partner and will provide you help and answers within 24 hours: +43 (0) 7242 615 1388 or apptec.wr@teufelberger.com

#### On and off-field training

Your everyday challenge is to ensure the smooth performance of your equipment at predictable costs. A combined experience of 425 years in the manufacture, installation and inspection of ropes has made Teufelberger-Redaelli what it is today - the best in rope handling.

In concise, yet comprehensive training, our experienced field engineers will share their expertise with you. Training sessions are vivid lessons offering theoretical and practical knowledge. The skills you can develop in this training include:

- Understand rope types and constructions to make the right choice
- Profound knowledge about installing ropes properly
- Know when the rope has to be discarded according to ISO 4309
- Know how to store the rope appropriately
- Improve your rope handling experience through practical lessons
- Socketing training
- Key insights into multilayer spooling
- Troubleshooting according to your needs

### Become a certified rope specialist



### THE RIGHT END TERMINATION

A true high-quality rope must always include the right end termination. Teufelberger-Redaelli offers a large range of standard end terminations made in casting or swaging processes according to EN 13411. Apart from conventional terminations, our assembling departments are also equipped to process crane specific terminations.

#### Teufelberger-Redaelli Pull-Eye

The first reeving aid with a guaranteed WLL (Working Load Limit) for Teufelberger-Redaelli steel wire ropes. A large number of crane ropes are provided with a so-called "reeving aid" at their outer end in order to facilitate their installation on the winch drum of the crane or deep foundation machines. In most cases, these end terminations are welded, swaged, or otherwise fitted to the rope. Typically, rope end terminations, such as Becket Loops, Becket Eyes, welded chain links, pulling sleeves and the like, will also include a thinner pulling rope. It should be clearly understood that the use of these end terminations introduces a risk of damage or personal injury if not properly controlled and fitted to the wire rope in a competent manner.

The Teufelberger-Redaelli Pull-Eye helps: Teufelberger-Redaelli is one of the first rope manufacturers providing the weld-connected pull-eye corresponding to the requirements of ISO 16841 with guaranteed WLL (working load limit). Each rope end fitted with the Teufelberger-Redaelli Pull-Eye is provided with a safety tag in the form of a pictogram indicating the WLL. This ensures that the person who installs the rope will know for sure what the applicable maximum load is.

Nominal Size	Rope Ø [mm]	WLL [t]
5	15 – 19	0.35
6	20 - 24	0.5
7	25 – 27	0.75
8	28 – 35	1
10	36 - 45	1.5
13	46 - 56	2.5
16	57	5

#### WLL Teufelberger-Redaelli Pull-Eye



"All common end terminations can be processed at Teufelberger-Redaelli after consultation and after technical testing in accordance with the guidelines of DIN ISO 13411. Ongoing internal quality checks contribute to consistently high-quality processing."

Michael Nowicki - Field Engineer R&D of steel wire ropes

### Customized end terminations

### soLITE® - THE INNOVATION FOR LIFTING APPLICATIONS

TEUFELBERGER, the mother company of Teufelberger-Redaelli, is the only rope specialist worldwide that is leading in both the wire rope and the fiber rope world. In a joint effort spanning several years, TEUFELBERGER and Liebherr, one of the world's leading crane manufacturers, developed soLITE<sup>®</sup>, a ground breaking, innovative high-strength fiber rope for challenging lifting applications, especially for use on tower, mobile, and crawler cranes.

#### Patented soLITE® construction

soLITE<sup>®</sup> is a fiber rope featuring a unique, innovative, and patented fiber-rope based steel wire rope construction. We designed soLITE<sup>®</sup> by using the best, extremely lightweight, high-strength synthetic fiber. The impressive result is a combination of the advantages of a high-performance steel wire rope with those of a high-strength fiber rope.

### soLITE<sup>®</sup> sets standards in determining point of discard for fiber ropes

While the point of discard for steel wire ropes can be determined reliably based on the number of broken wires, damage symptoms, or corrosion, this has so far not been possible for fiber ropes. For soLITE<sup>®</sup>, the point of discard can be determined redundantly through the defined wear of cover and a bending cycle counter on the crane.

In effect since 2017, the FEM 5.024 standard defines guidelines, particularly regarding the point of discard for the safe use of high-performance fiber ropes on cranes. At the time when the point of discard has been reached,  $soLITE^{\circ}$ , thanks to its construction, still has 100% of its breaking load. This makes  $soLITE^{\circ}$  even safer than a steel wire rope.

#### soLITE® convinces in the wire rope world

High-performance steel wire ropes are undoubtedly a good solution for many use scenarios. In particular, soLITE<sup>®</sup> offers you unbeatable advantages for many challenging lifting applications such as on tower, mobile, or crawler cranes.

- ✓ 80% lower rope weight. Hence, lighter hook block and thus 10% greater loading capacity than with steel wire rope
- Environmentally friendly no lubricants
- ✓ No wear on crane components such as sheaves and drums
- ✓ Many times longer rope lifetime
- ✓ Higher crane availability
- Easy detection of point of discard
- ✔ Great ease of handling

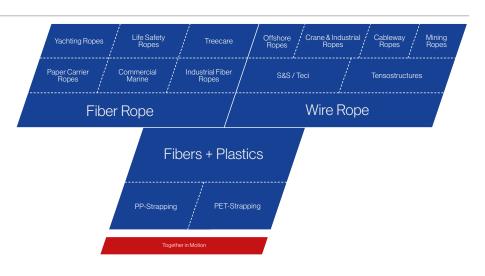


# TEUFELBERGER-REDAELLI IS PART OF SOMETHING BIGGER

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.

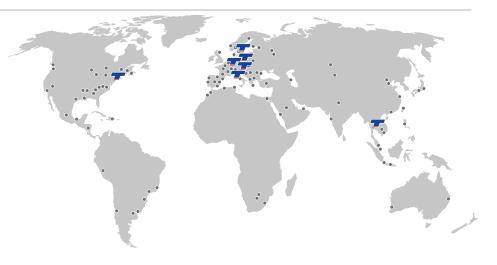
#### Great diversity

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 ensures 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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