WRI
a BRIDON · BEKAERT Ropes Group Brand

surface mining.

For decades, the Wire Rope Industries brand has been synonymous with surface mining and performance. We constantly push our manufacturing capabilities and engineering to the next level, as we pursue innovation to meet and exceed our clients' expectations.

Bridon-Bekaert Ropes Group is continuously investing in its capabilities. We have recently installed one of the largest machines in the world and are in the process of upgrading other machinery to boost our versatility and responsiveness to the market. We are working on the next generation of shovel and dragline ropes in cooperation with our flagship clients.

BRIDON · BEKAERT

THE ROPES GROUP

Bridon-Bekaert Ropes Group is the world's premier supplier of mission-critical advanced cords, steel wire ropes, and fibre synthetic ropes.

As a leading innovator, developer and producer of the best performing ropes and advanced cords globally, the Group provides superior value solutions to the oil & gas, mining, crane, elevator and other industrial sectors.

Two of the most enduring wire and rope pioneers joined forces in 2016 to make this ambition real. Bridon-Bekaert Ropes Group has a global manufacturing footprint and employs approximately 2500 people worldwide.

capabilities.

Bridon-Bekaert operates the largest 8-bobbin closer in the Americas, with a capacity of 120 metric tons, as well as a range of sophisticated stranders, including one of the fastest machines in the world. We also employ industry-leading extrusion lines, with a proprietary process developed over two decades of making large plasticized ropes.

A combination of versatile machinery and more than 125 years of experience gives Bridon-Bekaert Ropes Group the ability to manufacture an unmatched range of high-end products:

- 6 or 8-strand ropes up to 8" (203mm)
- Large plasticized ropes up to 6" (152mm)
- Structural strand up to 6" (152mm)
- Triangular flattened strand ropes
- Full-lock and half-lock coil ropes
- Cable laid ropes up to 12" (305mm)
- Long continuous lengths up to 29,000' (8.8km) of 2" (51mm)

These capabilities allow us to supply ropes for some of the largest equipment in use today, including dragline excavators and long cable belt conveyor systems. We regularly supply major supported roof structures, suspension bridges and communication tower projects around the globe. In addition to our current lineup, we can custom design and manufacture unique ropes to the specific requirements of your application.

certifications.

ISO 9001 Certified

Bridon-Bekaert is committed to quality assurance. All employees are working under a ISO 9001:2008 registered quality management system, from the shop floor to the executive office.

At Bridon-Bekaert, we strive to:

- Fulfill the customer's quality requirements
- Conform to applicable regulatory requirements
- Enhance customer satisfaction
- Achieve continuous improvement

Lloyds Register

Lloyds Register provides independent assurance to companies operating high-risk, capital-intensive assets in the energy and transportation sectors, to enhance the safety of life, property and the environment. This helps Bridon-Bekaert to create safe, responsible and sustainable supply chains.

The Lloyd's Register Group is one of the world leaders in assessing business processes and products to internationally recognized standards.

For more information on this, please visit http://www.lr.org

quality.

Our multiple certifications by recognized regulatory bodies testify to our drive to bring the best quality and value product to our clients. We uphold our high standards of quality by employing the following processes.

Material supplier qualification

We run one of the most stringent supplier qualification programs in the industry. Our business is built on the consistency and quality of raw materials.

Employee training and education

We constantly improve competencies of our employees through supporting ongoing education and training programs and ensure that they have the correct tools to excel in their jobs.

Equipment calibration and maintenance

Calibrated and well-maintained equipment leads to greater product consistency and on-time delivery.

Coordinated and planned inspections

Planned inspections assure product consistency and conformity to specification.

Consistency through procedures

Documented and maintained procedures ensure all employees use the same work methods.

Audit and corrective actions

Internal audits and corrective actions ensure systems are effective and that continuous improvement is realized

Document verification

Formalized and monitored documentation allows for the complete tracking of product, processes, and materials.

Quality monitoring through inspection and testing

We monitor the quality of incoming materials, semi-manufactured products during manufacturing, and final products to ensure the quality standards are met before shipment.

Breaking load verification

Computerized destructive testing confirms the actual breaking load of individual rope and strand.

Field simulation through cycle testing

Fatigue cycle testing, simulating field conditions, verifies actual rope fatigue life.

Statistical Process Control (SPC)

We perform process capability studies to maintain and improve the quality of our manufacturing operations. Continuous measuring devices and procedures allow us to monitor if the process consistently meets specifications. They are also used to define control limits, which are used to flag inconsistencies and trigger immediate corrective actions. Ongoing SPC training for supervisory and operator personnel ensures adherence to procedures and that equipment is operated to peak efficiency.

research & development.

Drawing from years of engineering expertise, Bridon-Bekaert has developed one of the most sophisticated design and testing systems in the marketplace today. Our technologies and precision testing allows us to examine and resolve complex problems quickly and efficiently, ensuring optimum performance for each design.

Our Test Lab and Field Facilities provide us with the following capabilities:

- Our in-line EM testing equipment for underground mining ropes is capable of detecting broken wires, rope distortion, and establishing the baseline for loss of metallic area verification during rope life.
- Tensile testing of ropes up to 180 metric tons and all types of wire
- Evaluation rotation and modulus of wire ropes
- Actual bending fatigue cycle testing under load, to simulate field conditions and optimize designs using two proprietary fatigue testing machines
- Metallurgical analysis, including full chemical and structural analysis of all steel components, allows for optimum wire selection for each design.
- Specialized material testing on key components such as lubricants, plastics and synthetics allows for the selection of the most appropriate materials for our designs
- Field sample analysis allows us to verify design parameters and development new ideas for improvement by comparing laboratory test results with actual customer samples.

Your feedback is important

A majority of our technical innovations come from customer feedback. Aftersales relationships are as important to Wire Rope industries as they are to our customers. We rely on field data to improve our products and bring more value to your operations.

Joint Product Development

We developed some of our most successful products through relationships with our long-term clients. We strive to understand the challenges that our clients face in their operations in order to be able to develop performance solutions for them. This process is especially fruitful when both sides understand the benefits and are open to employ their engineering resources towards the same goal. Contact us and learn how we can work together to develop custom solutions tailored to your needs

BBtec

- Post-retirement rope analysis
- Rope condition assessment
- Forensic investigation
- Rope product benchmarking
- Rope mechanical testing
- Condition assesment
- Supply chain integrity management
- Rope torque-turn testing
- Destruction testing and wire tensile testing

Ropes360

shovel ropes overview.

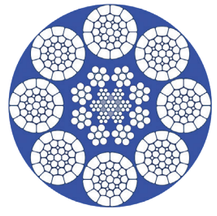
shovel ropes.

At Bridon-Bekaert, we take special pride in our expertise and world-class products for shovel applications. Since electro-mechanical shovels emerged as productivity drivers in mines around the world, the Wire Rope Industries brand has continuously been investing in innovation and pushing the boundaries of performance for these machines.

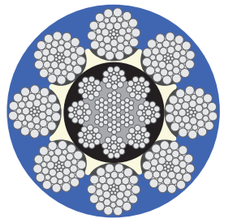
We were among the pioneers of thermo-plastic technology in the early 1980s, and our Cushion Ropes have been used by mining leaders throughout the Americas. The latest generation of patented Cushion-Pac Ultra™ ropes has raised the performance bar even further. Our ropes are now used by most major operators of large shovels in every type of commodity market.

The race for productivity does not stop with Cushion-Pac Ultra™. For our clients, we can go a step further and design unique high-end ropes specifically for their machinery and operating conditions. The custom design program sometimes results in new technological breakthroughs, like the CPX, which edges out even the Cushion-Pac Ultra™ in terms of performance.

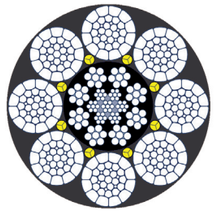
product offerings.



Cushion Rope

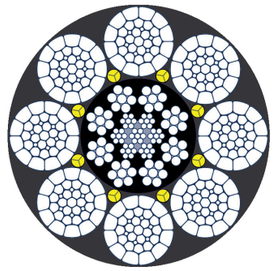


Cushion-Pac Ultra



Cushion-Pac Extreme
CPX

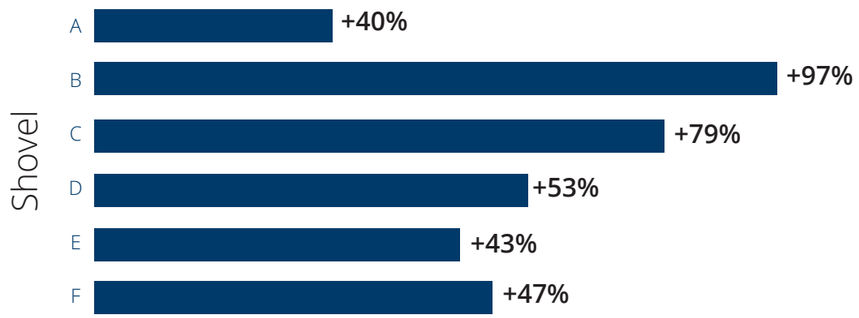
CPX
Cushion Pac Extreme



Extreme 8 strand construction with nylon jacket for shovels and dragline ropes

- The world's first nylon jacketed shovel rope delivers unparalleled service life in the most extreme environments
- Patented design and construction provides earth shattering annual savings
- Proven performance and consistently outclasses any known rope manufactured in the world today

CPX vs. Premium Competitors



Disclaimer: Our clients typically measure Hours of Operation, or Tons Excavated. Each row shows relative improvement in rope life on one of the customer shovels after switching to WRI product, relative to previous average life of competitor's product. Results may vary depending on the machine and digging conditions.

Development

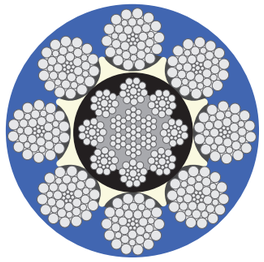
Developed in the extreme operating conditions in the Oil Sands of Northwest Canada, the Cushion Pac Extreme (CPX) was recently launched after a successful testing phase. This rope is a result of more than two decades of experience in serving the shovel rope market worldwide and sets the next standard for rope performance.

Environment and Machinery

CPX is designed to operate in a wide range of operating conditions where temperature can range from -40° to +40° with difficult digging conditions and minimal fragmentation. This earth-shattering design has been developed and tested on multiple machines with different hoisting configurations .

Shown below are some of the excellent results of CPX against the premium offerings of our competitors. Percentage improvements in rope life are based on the CPX performance measured by the clients relative to the average achieved by the incumbent ropes on the same machine.

Cushion-Pac Ultra



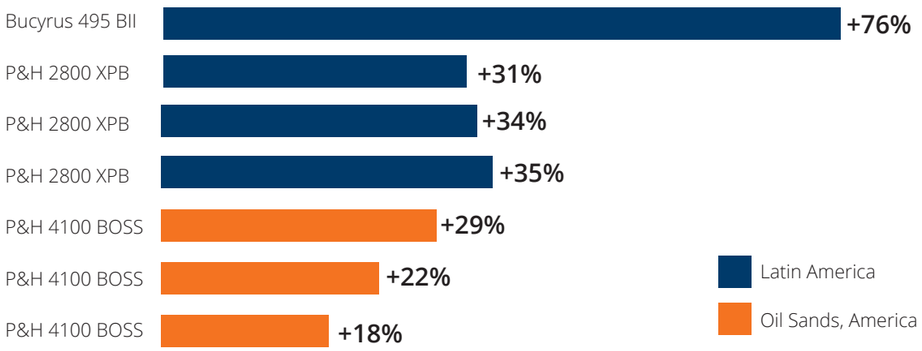
The patented Cushion-Pac Ultra is our flagship premium rope for modern excavators. Developed through years of field analysis and product design, and perfected in cooperation with our clients, the Cushion-Pac Ultra™ has established it self as the industry benchmark for performance in all types of environments.

This rope has outperformed the competition in oil sand, coal, iron ore, and copper mining across North and South America. If you want to maximize the productivity of your shovels, look no further.

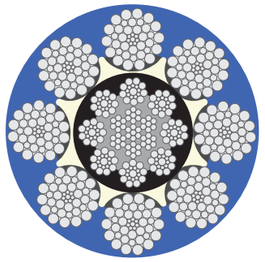
Cushion-Pac Ultra™ ropes have proven themselves in the environments as harsh as Oil Sands in Northwest Canada, where shovels operate around the clock in temperatures from -40° to +40°. Our clients dig material of various degrees of fragmentation, from well fragmented coal to frozen chunks of bitumen weighing tens of tons.

We supply a full range of shovels, and Cushion-Pac Ultra™ is currently used on the largest available shovels with bucket capacities over 70m^3.

Cushion-Pac Ultra vs. Premium Competitors strand-to-core contacts



Cushion Rope™



Our Cushion Rope™ for shovel excavators is considered a proven design with two decades of service behind it. Cushion Rope™ is a solution for mines looking for reliable performance and good value.

- The Cushion Rope™ features rock solid 8-strand DyPac™ construction with exceptional strength, resistance to crushing, and resulting good fatigue life.
- Bridon-Bekaert's industry-leading thermal injection process ensures deep penetration of plastic into the rope, which provides core protection, strong strand support, keeps abrasives and moisture out, and maximizes the surface contact area.
- Calibrated cut-lengths, high-efficiency ferrule becket and available hairpin winding ensure correct installation and reduced downtime.

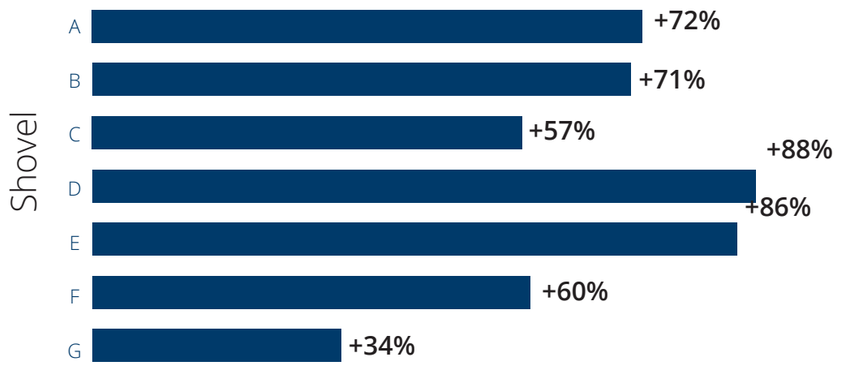
Custom Ropes

Bridon-Bekaert has a successful track record of designing custom ropes for your unique combination of machinery, digging conditions, and operational demands. We maintain an extensive database of past R&D projects during which we tested hundreds of combinations of constructions and materials. This body of knowledge, coupled with expertise of our engineers, allows us to craft special purpose ropes with significantly better lifetime compared to off-the-shelf items. Some of the areas of customization are:

- Advanced plastics and nylons
- Advanced lubricants
- Core and strand design
- Specialized high-tensile wire and wire coatings
- Outer reinforcements

The results below show the performance of one of our recent custom ropes, based on Cushion-Pac Ultra platform, against one of the premium offerings of our major competitor. Contact Bridon-Bekaert to discuss your operational requirements and let us make better custom rope designed specifically to your needs.

Custom Ropes vs. Premium Competitors (Oil Sands)



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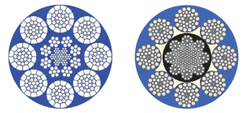
shovel product tables.

Cushion Rope

Cushion Pac Ultra



DIAMETER		CONSTRUCTION	APPROX. WEIGHT		MINIMUM BREAKING LOAD	
inches	mm		lb/ft	kg/m	Tons	kN
1 1/2	38	8 x 31 Dy-Pac 8 CR/CC & CPU	4.5	6.7	110	981
1 5/8	41	8 x 31 Dy-Pac 8 CR/CC & CPU	5.3	7.9	128	1,141
1 3/4	44	8 x 31 Dy-Pac 8 CR/CC & CPU	6.2	9.2	150	1,336
1 7/8	48	8 x 31 Dy-Pac 8 CR/CC & CPU	7.1	10.5	171	1,522
2	51	8 x 31 Dy-Pac 8 CR/CC & CPU	7.9	11.7	192	1,708
2 1/8	54	8 x 31 Dy-Pac 8 CR/CC & CPU	9.1	13.5	220	1,962
2 1/4	57	8 x 31 Dy-Pac 8 CR/CC & CPU	10.1	15.1	245	2,181
2 3/8	60	8 x 31 Dy-Pac 8 CR/CC & CPU	11.2	16.7	271	2,410
2 1/2	64	8 x 31 Dy-Pac 8 CR/CC & CPU	12.6	18.7	304	2,706
2 5/8	67	8 x 31 Dy-Pac 8 CR/CC & CPU	14.0	20.8	339	3,018
2 3/4	70	8 x 36 Dy-Pac 8 CR/CC & CPU	15.2	22.6	351	3,120
2 7/8	73	8 x 36 Dy-Pac 8 CR/CC & CPU	16.6	24.7	400	3,562
3	76	8 x 36 Dy-Pac 8 CR/CC & CPU	18.1	26.9	436	3,881

This table is for guidance purposes only with no guarantee or warranty (express or implied) as to its accuracy. The products described may be subject to change without notice, and should not be relied on without further advice from Bridon-Bekaert. The cross section image is for reference only. Actual cross sections vary due to diameter.Visit www.bridon-bekaert.com for the most up-to-date data.

Cushion Pac Extreme (CPX)

DIAMETER	CONSTRUCTION	APPROX. WEIGHT		MINIMUM BREAKING LOAD	
inches		lb/ft	kg/m	Tons	kN
2 3/8	Cushion Pac Extreme	11.09	16.50	318	2829
2 1/2	Cushion Pac Extreme	12.27	18.25	350	3114
2 5/8	Cushion Pac Extreme	13.3	19.79	379	3372
2 3/4	Cushion Pac Extreme	14.49	21.56	398	2651
2 7/8	Cushion Pac Extreme	15.80	23.75	440	3914

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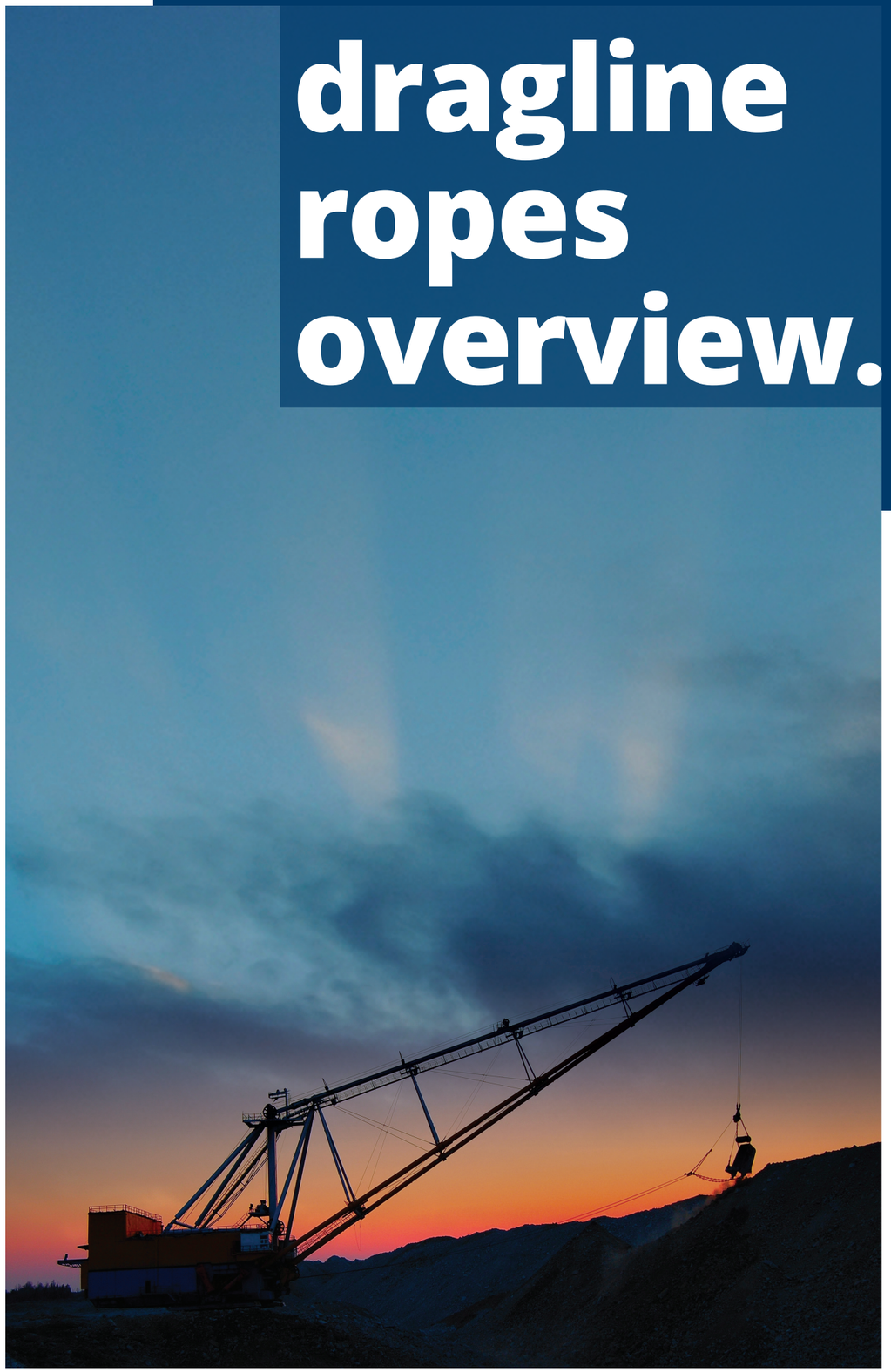
dragline ropes overview.

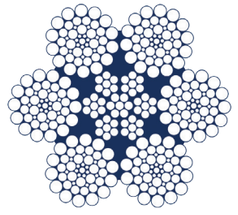


dragline ropes.

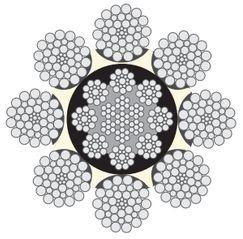
Built on our extensive experience and innovation in surface mining, Bridon-Bekaert's product range for dragline excavators is unparalleled in the industry. We are the only manufacturer who offers a full line of products, from the industry-standard 6-strand basic ropes to the revolutionary Cushion Ultra™, which set the bar for performance.

Our experts are available to assess your operations and help you find the rope that maximizes productivity and reduces maintenance costs.

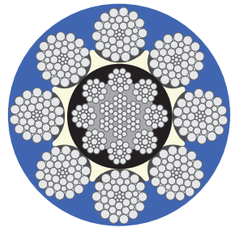
product offerings.



6S Basic

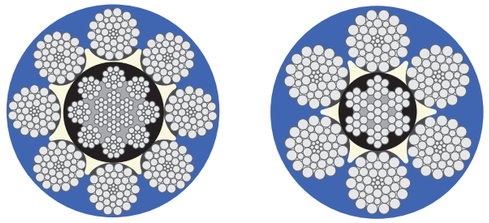


Ultra



Cushion Ultra™

Cushion Ultra™



To address the growing productivity requirements of dragline mining industry, Bridon-Bekaert developed a next generation of premium dragline ropes, which outperforms the basic 6-strand design by a large margin. Tested and proven on some of the biggest draglines in the world, these new ropes have become a benchmark for performance.

Design and Features

Cushion Ultra™ features a patented design with inter-strand spacers to minimize metal-to-metal contact and ensure ideal load distribution.

Heavy-duty core, built using proprietary high pressure plastic extrusion process

Best-in-industry outer plastic jacket retains internal lubrication and minimizes wear on sheaves and drums

6-strand construction provides larger diameter strand for improved resistance to abrasion and is typically used for drag rope position.

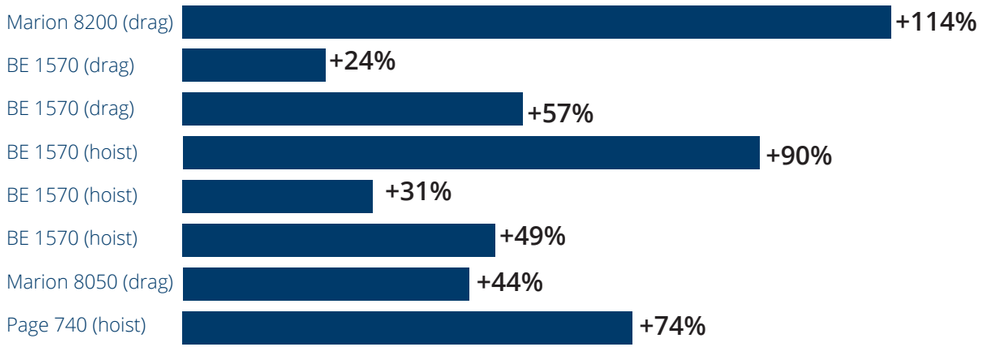
8-strand construction features increased flexibility and is typically used for hoist rope position.

Benefits

- The patented Cushion Ultra™ has been a great success in the North American market thanks to the clear value it creates for the clients relative to 6-strand standard ropes.
- Longest lifetime of any dragline rope on the market
- Significant reduction in downtime and number of rope change-outs
- Minimized sheave and drum wear
- Overall improvement in rope and machine cleanliness

Performance

Cushion Ultra vs. 6-strand competitors (U.S. coal mining)



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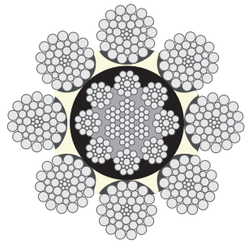
Ultra

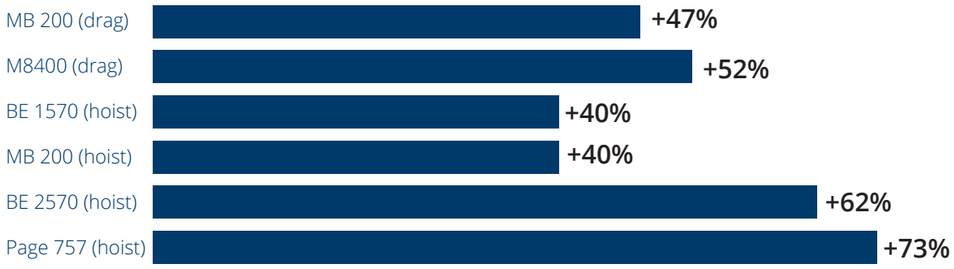
For clients who want the breakthrough construction of Cushion Ultra™, but require visibility of the outer strands for inspection purposes, Bridon-Bekaert offers Ultra.



Ultra ropes feature the same construction as Cushion Ultra™, but without the outer plastic jacket. Although slightly behind Cushion Ultra™ in terms of performance, Ultra provides major improvement in rope life over standard 6-strand ropes, and is very popular upgrade choice among our clients.

Ultra is available in 6-strand design for drag position and 8-strand configuration for hoist position.

Ultra vs. 6-strand competitors (U.S. coal mining)



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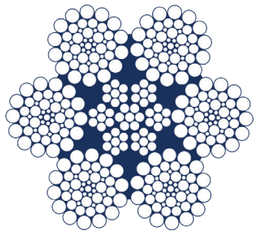
6S BASIC



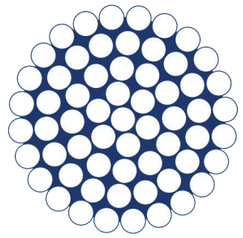
For the clients who prefer the proven 6-strand rope without jacketing, Bridon-Bekaert offers the rock-solid 6S Basic.

- Rugged 6 strand construction for excellent wear resistance
- Specially selected wire tensiles and a heavy-duty IWRC core
- Advanced lubricants extend rope life and reduce fly-off

Many of our clients who tested Cushion Ultra and Ultra have converted from 6S Basic. Contact our application experts to learn how switching to our premium ropes can create value for your operation.

Bridge Strands and Sockets

PS 1000™ Boom Pendants



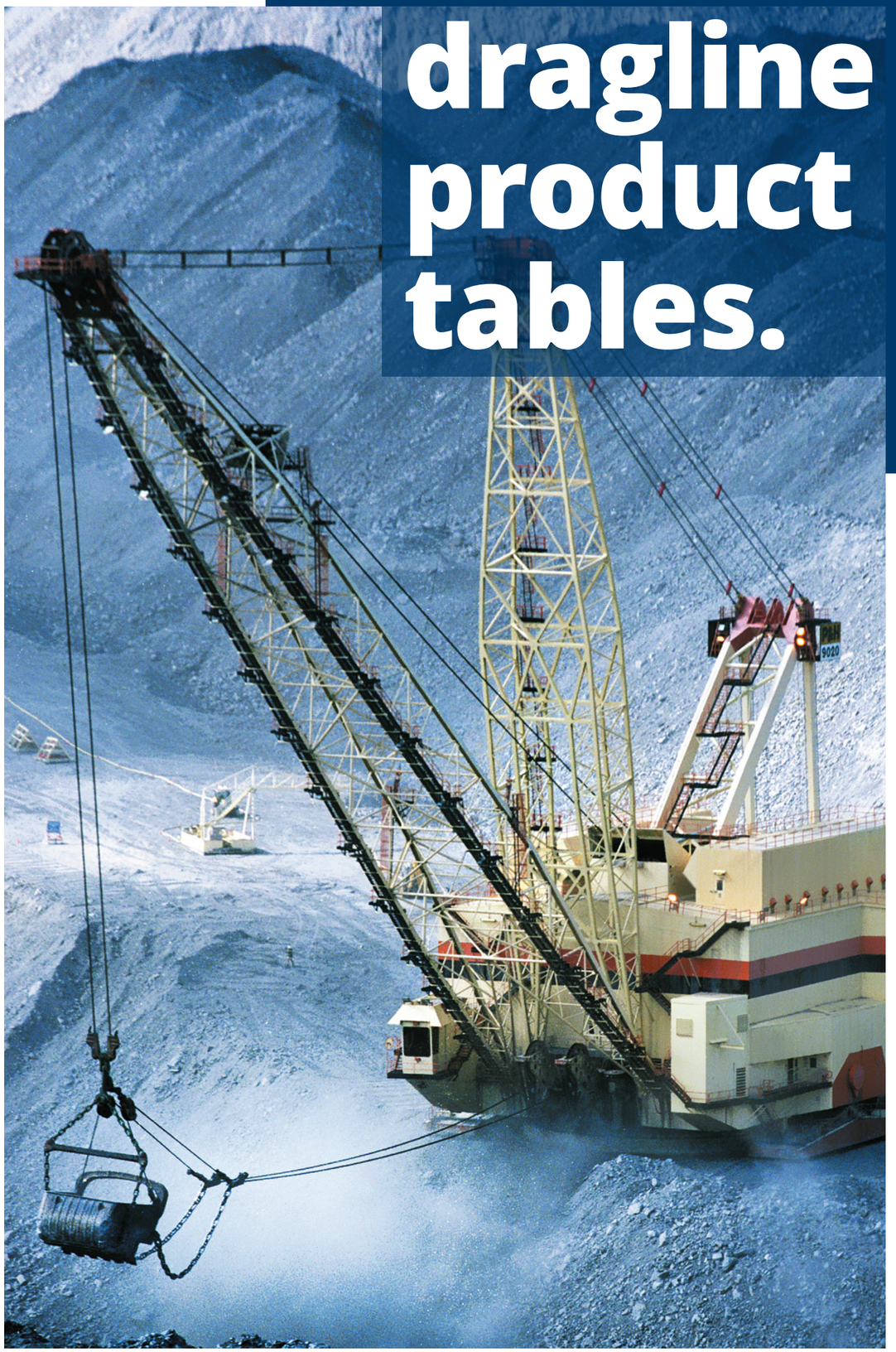
For the boom support applications, we offer our PS 1000 line of products, specially designed and tested for superior performance.

- Wide range of sizes up to 4 1/2" (114 mm) diameter
- Pre-stretch and socketing capabilities include one of the largest facilities in the world with a 960 ft (295 m) long, 800 000 lbs (365 000 kg) capacity pre-stretch bed and 40 ft. (12.2 m) socketing tower.
- Accurate high quality pendants are supplied consistently by incorporating quality control processes including socket inspection and testing, under tension length markings and precision cuts, and specially designed socketing equipment.
- Pendants can be correctly positioned and efficiently installed with special length markings and custom manufactured transport reels.
- Equipment operation and safety is enhanced with the low stretch, equally balanced support of strand pendants.
- Greater metallic area and higher strength-to-diameter ratios reduce stretch and increase service life when compared to rope pendants

PS 1000 pendants are cost effective

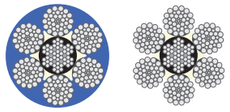
Reduced long term capital purchase costs resulting from increased service life.

Reduced equipment maintenance costs resulting from more stable boom structures.



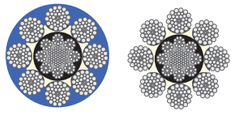
dragline product tables.

6 Strand Cushion Ultra & 6 Strand Ultra



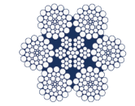
DIAMETER		CONSTRUCTION	APPROX. WEIGHT		MINIMUM BREAKING LOAD	
inches	mm		lb/ft	kg/m	Tons	kN
2 3/4	(70)	6 Strand Ultra / Cushion Ultra	12.7	18.9	311	2,765
2 7/8	(73)	6 Strand Ultra / Cushion Ultra	13.9	20.7	341	3,035
3	(76)	6 Strand Ultra / Cushion Ultra	15.2	22.6	371	3,297
3 1/8	(79)	6 Strand Ultra / Cushion Ultra	16.5	24.6	402	3,576
3 1/4	(83)	6 Strand Ultra / Cushion Ultra	18.0	26.8	440	3,915
3 3/8	(86)	6 Strand Ultra / Cushion Ultra	19.4	28.9	468	4,168
3 1/2	(89)	6 Strand Ultra / Cushion Ultra	20.8	31.0	543	4,836
3 5/8	(92)	6 Strand Ultra / Cushion Ultra	22.5	33.5	583	5,191
3 3/4	(95)	6 Strand Ultra / Cushion Ultra	24.0	35.7	625	5,563
3 7/8	(98)	6 Strand Ultra / Cushion Ultra	25.7	38.2	646	5,749
4	(102)	6 Strand Ultra / Cushion Ultra	27.5	40.9	689	6,130
4 1/8	(105)	6 Strand Ultra / Cushion Ultra	29.3	43.6	732	6,519
4 1/4	(108)	6 Strand Ultra / Cushion Ultra	31.2	46.4	777	6,916
4 3/8	(111)	6 Strand Ultra / Cushion Ultra	33.4	49.7	824	7,330
4 1/2	(114)	6 Strand Ultra / Cushion Ultra	35.2	52.4	871	7,753
4 5/8	(117)	6 Strand Ultra / Cushion Ultra	37.2	55.4	921	8,193
4 3/4	(121)	6 Strand Ultra / Cushion Ultra	39.3	58.5	971	8,641
4 7/8	(124)	6 Strand Ultra / Cushion Ultra	41.4	61.6	1,023	9,106
5	(127)	6 Strand Ultra / Cushion Ultra	43.5	64.7	1,076	9,579

8 Strand Cushion Ultra & 8 Strand Ultra



DIAMETER		CONSTRUCTION	APPROX. WEIGHT		MINIMUM BREAKING LOAD	
inches	mm		lb/ft	kg/m	Tons	kN
2 3/4	70	8 Strand Ultra / Cushion Ultra	12.9	19.2	313	2,782
2 7/8	73	8 Strand Ultra / Cushion Ultra	14.1	21.0	342	3,044
3	76	8 Strand Ultra / Cushion Ultra	15.4	22.9	371	3,306
3 1/8	79	8 Strand Ultra / Cushion Ultra	16.7	24.9	403	3,585
3 1/4	83	8 Strand Ultra / Cushion Ultra	18.3	27.2	439	3,906
3 3/8	86	8 Strand Ultra / Cushion Ultra	19.6	29.2	470	4,185
3 1/2	89	8 Strand Ultra / Cushion Ultra	21.1	31.4	505	4,498
3 5/8	92	8 Strand Ultra / Cushion Ultra	22.3	33.2	542	4,828
3 3/4	95	8 Strand Ultra / Cushion Ultra	24.2	36.0	580	5,166
3 7/8	98	8 Strand Ultra / Cushion Ultra	26.0	38.7	628	5,589
4	102	8 Strand Ultra / Cushion Ultra	27.8	41.4	669	5,952
4 1/8	105	8 Strand Ultra / Cushion Ultra	29.8	44.3	719	6,400
4 1/4	108	8 Strand Ultra / Cushion Ultra	31.8	47.3	764	6,798
4 3/8	111	8 Strand Ultra / Cushion Ultra	33.9	50.4	816	7,263
4 1/2	114	8 Strand Ultra / Cushion Ultra	36.0	53.6	856	7,618
4 5/8	117	8 Strand Ultra / Cushion Ultra	38.3	57.0	904	8,049
4 3/4	121	8 Strand Ultra / Cushion Ultra	40.4	60.1	954	8,488
4 7/8	124	8 Strand Ultra / Cushion Ultra	42.5	63.2	1,005	8,945
5	127	8 Strand Ultra / Cushion Ultra	44.8	66.7	1,057	9,410

6S Basic



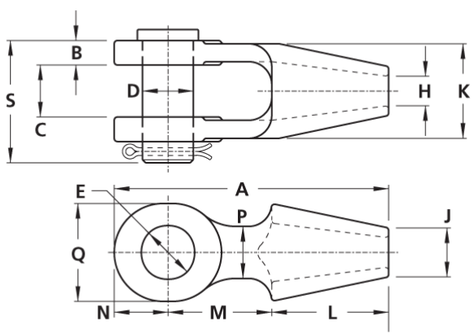
DIAMETER		CONSTRUCTION	APPROX. WEIGHT		MINIMUM BREAKING LOAD	
inches	mm		lb/ft	kg/m	Tons	kN
1 1/2	38	6x41 RLL IWRC	4.2	6.2	108	964
1 5/8	41	6x41 RLL IWRC	5.0	7.4	126	1,125
1 3/4	44	6x41 RLL IWRC	5.7	8.4	145	1,294
1 7/8	48	6x41 RLL IWRC	6.5	9.7	165	1,471
2	51	6x41 RLL IWRC	7.6	11.4	188	1,674
2 1/8	54	6x41 RLL IWRC	8.4	12.4	210	1,869
2 1/4	57	6x41 RLL IWRC	9.4	13.9	235	2,088
2 3/8	60	6x41 RLL IWRC	10.2	15.2	243	2,164
2 1/2	64	6x41 RLL IWRC	11.3	16.9	277	2,469
2 5/8	67	6x41 RLL IWRC	12.5	18.6	311	2,765
2 3/4	70	6x41 RLL IWRC	13.8	20.5	344	3,061
2 7/8	73	6x43 RLL IWRC	14.9	22.2	378	3,365
3	76	6x43 RLL IWRC	16.3	24.2	411	3,661
3 1/8	79	6x43 RLL IWRC	17.6	26.3	445	3,957
3 1/4	83	6x43 RLL IWRC	19.5	29.1	479	4,261
3 3/8	86	6x43 RLL IWRC	20.5	30.5	512	4,557
3 1/2	89	6x49 RLL IWRC	21.8	32.5	545	4,853
3 5/8	92	6x49 RLL IWRC	23.8	35.5	580	5,157
3 3/4	95	6x49 RLL IWRC	25.3	37.7	613	5,453
3 7/8	98	6x49 RLL IWRC	27.3	40.6	683	6,079
4	102	6x49 RLL IWRC	29.1	43.4	731	6,502
4 1/8	105	6x49 RLL IWRC	31.5	46.9	777	6,916
4 1/4	108	6x49 RLL IWRC	33.4	49.8	825	7,339
4 3/8	111	6x49 RLL IWRC	35.4	52.7	872	7,761
4 1/2	114	6x49 RLL IWRC	37.3	55.4	943	8,395
4 5/8	117	6x49 RLL IWRC	39.1	58.3	984	8,757
4 3/4	121	6x49 RLL IWRC	41.7	62.1	1,057	9,410

Open Spelter Sockets

STRAND DIAMETER	ROPE DIAMETER	A	B	C	ØD	ØE	ØH	ØJ	K	L	M	N	P	Q	S	WT LBS.
1/2	9/16–5/8	6.75	0.56	1.25	1.19	1.25	0.69	1.13	2.38	3	2.56	1.25	1.25	2.25	3.06	4
9/16–5/8	3/4	7.94	0.69	1.5	1.38	1.44	0.81	1.38	2.74	3.5	3	1.44	1.5	2.63	3.44	7
11/16–3/4	7/8	9.25	0.81	1.75	1.63	1.69	1	1.63	3.25	4	3.5	1.75	1.75	3.25	3.94	10
13/16–7/8	1		0.94	2	2	2.06	1.13	1.75	3.75	4.5	4	2.06	2	3.75	4.63	15
15/16–1	1-1/8		1	2.25	2.25	2.31	1.25	1.94	4.25	5.06	4.5	2.31	2.38	4.13	5.13	23
1-1/16–1-1/8	1-1/4–1-3/8		1.13	2.5	2.5	2.56	1.5	2.19	4.69	5.38	5	2.69	2.88	4.63	5.81	33
1-3/16–1-1/4	1-1/2		1.19	3	2.75	2.81	1.63	2.75	5.38	6	6	3.13	3	5.38	6.25	43
1-5/16–1-3/8	1-5/8		1.31	3	3	3.06	1.75	2.88	5.63	6.5	6.5	3.25	3.25	5.75	6.5	52
1-7/16–1-5/8	1-3/4–1-7/8		1.63	3.5	3.5	3.56	2	3.13	6.25	7.5	7	3.88	3.88	6.5	7.63	83
1-11/16–1-3/4	2–2-1/8		1.81	4	3.75	3.81	2.25	3.75	7.5	8.5	9	4.25	4.25	7.25	8.88	127
1-13/16–1-7/8	—		1.81	4	4	4.06	2.25	3.75	7.5	8.5	9	4.25	4.25	7.25	9	130
1-15/16–2	2-1/4–2-3/8		2.13	4.5	4.25	4.31	2.5	4	8.38	9	10	4.75	4.38	8	10	178
2-1/16–2-1/8	—		2.13	4.5	4.5	4.56	2.5	4	8.38	9	10	4.75	4.38	8	10	184
2-3/16–2-1/4	2-1/2–2-5/8	26	2.38	5	4.75	4.81	2.88	4.5	9.25	9.75	11	5.25	4.75	8.5		236
2-5/16–2-3/8	2-3/4–2-7/8		2.88	5.25	5	5.06	3.13	5.31		11.5	11.5	5.25	5.25	9	12.5	315
2-7/16–2-9/16	3–3-1/8		3	5.75	5.25	5.31	3.38	7.5		12.5	11.5	5.75	5.5	9.5		424
2-5/8–2-3/4	3-1/4	30.5	3	6	5.75	5.81	3.5	7.38	11.5	12.5	12	6	5.5	9.75	13.5	484
2-7/8–3	3-3/8		3.13	6.25	6	6.06	3.63	7.63	11.5	12.5	12	7.25	6	12		558
3-1/8–3-1/4	3-1/2	32.5	3.25	6.75	6.5	6.56	3.88	8.25			12.5	6.75	7		15	627
3-3/8–3-1/2	3-5/8		3.38	7.25	6.75	6.81	4	8.63		14	13	7.75	7.25			734
3-5/8–3-3/4	3-3/4–4		3.5	7.5	7	7.06	4.25	9.25		15	13.5	7.75	7.5	13		844
3-7/8–4	4-1/8		3.63	8	7.25	7.31	4.5	9.75	14.5	15.5		9	8	14.5	17	999
4-1/8–4-3/8	4-1/4–4-1/2		3.88	8.25	7.25	7.31	5.25	9.5	16	18.5	16.5	9.38	8.5	15		1217
4-1/2–4-3/4	4-3/4–5		4	8.5	7.5	7.56	5.5	10.5	16.5	19		10	8.5	16		1405
4-7/8–5-1/8	5-1/4–5-1/2		4.5	8.75	8	8.06	6	11		21	18		9	16.5	19	1645
5-1/4–5-1/2	5-3/4–6		4.88	9	8.75	8.81	6.38	12		22.5	19		10	18	20	2090

All dimensions are in inches.

This table is for guidance purposes only with no guarantee or warranty (express or implied) as to its accuracy. The products described may be subject to change without notice, and should not be relied on without further advice from Bridon-Bekaert. The cross section image is for reference only. Actual cross sections vary due to diameter. Visit www.bridon-bekaert.com for the most up-to-date data.



PS 1000

Boom Pendants - Bridge Strand High Quality Structural Strand (ASTM-A-586)

DIAMETER INCHES (MM)	APPROX. WEIGHT LBS/FT (KG/M)	MINIMUM BREAKING LOAD-TONS (KN)
7/8 (22)	1.61 (2.40)	46 (409)
15/16 (24)	1.85 (2.75)	54 (480)
1 (25)	2.10 (3.13)	61 (543)
1-1/16 (27)	2.37 (3.53)	69 (614)
1-1/8 (29)	2.66 (3.96)	78 (694)
1-3/16 (30)	2.96 (4.40)	86 (765)
1-1/4 (32)	3.28 (4.88)	96 (854)
1-5/16 (33)	3.62 (5.39)	106 (943)
1-3/8 (35)	3.97 (5.91)	116 (1 032)
1-7/16 (37)	4.34 (6.46)	126 (1 121)
1-1/2 (38)	4.73 (7.04)	138 (1 228)
1-9/16 (40)	5.13 (7.63)	150 (1 335)
1-5/8 (41)	5.55 (8.26)	162 (1 441)
1-11/16 (43)	5.98 (8.90)	176 (1 566)
1-3/4 (44)	6.43 (9.57)	188 (1 673)
1-13/16 (46)	6.90 (10.27)	202 (1 797)
1-7/8 (48)	7.39 (11.00)	216 (1 922)
1-15/16 (49)	7.89 (11.74)	230 (2 046)
2 (51)	8.40 (12.50)	245 (2 180)
2-1/16 (52)	8.94 (13.30)	261 (2 322)
2-1/8 (54)	9.49 (14.12)	277 (2 464)
2-3/16 (56)	10.05 (14.95)	293 (2 607)
2-1/4 (57)	10.64 (15.83)	310 (2 758)
2-5/16 (59)	11.24 (16.73)	327 (2 909)
2-3/8 (60)	11.85 (17.63)	344 (3 060)
2-7/16 (62)	12.48 (18.57)	360 (3 203)
2-1/2 (64)	13.13 (19.54)	376 (3 345)
2-9/16 (65)	13.80 (20.53)	392 (3 488)
2-5/8 (67)	14.47 (21.53)	417 (3 710)
2-11/16 (68)	15.16 (22.56)	432 (3 843)
2-3/4 (70)	15.88 (23.63)	452 (4 021)
2-7/8 (73)	17.36 (25.83)	494 (4 395)
3 (76)	18.90 (28.12)	538 (4 786)
3-1/8 (79)	20.51 (30.52)	584 (5 196)
3-1/4 (83)	22.18 (33.00)	625 (5 561)
3-3/8 (86)	23.92 (35.59)	673 (5 988)
3-1/2 (89)	25.73 (38.29)	724 (6 441)
3-5/8 (92)	27.60 (41.07)	768 (6 833)
3-3/4 (95)	29.50 (43.90)	822 (7 313)
3-7/8 (98)	31.50 (46.87)	878 (7 811)
4 (101)	33.60 (50.00)	925 (8 230)
4-1/8 (105)	35.70 (53.12)	990 (8 810)
4-1/4 (108)	37.90 (56.40)	1 050 (9 350)
4-3/8 (111)	40.20 (59.82)	1 110 (9 880)
4-1/2 (114)	41.30 (61.45)	1 175 (10 460)

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inspection.

Carefully conducted inspections are necessary to ascertain the condition of wire and strand during its working life on the machine. The primary objective of inspection is to detect conditions that could be detrimental to continued normal operation of the product.

Bridon-Bekaert's Life Cycle Management (LCM) program is designed to help miners extract the full Bridon-Bekaert value.

Our LCM program begins with careful inspection before installation and periodically through the life of the wire rope and strand pendant. These investigations are necessary to wear patterns, monitor retirement criteria and ant machine damage that would adversely affect service life.

The individual making the inspection should be familiar with the product and operation, as his judgement is important. Various codes, regulations, and publications provide inspection requirements for specific applications. All operating ropes and strands should be visually inspected at least once each working day with a record made of the inspection. A visual inspection consists of the observation of all rope or strand and end connections which can reasonably be expected to be in use during daily operations. The visual observations should be concerned with discovering gross damage such as those listed below, which may be an immediate concern:

- Distortion of rope or strand such as kinking, crushing, unlaying, bird caging, main strand displacement, or core protrusion
- Corrosion
- Broken or cut strands
- Number, distribution, and type of broken wires
- Lubrication

Special care should be taken when inspecting sections or areas subjected to rapid deterioration, such as the wedge sockets on drag and hoist ropes, areas adjacent to sockets on strand pendants, pick-up points on drums and sheaves, and areas operating through fair-lead sheaves. Special care should be given to boom hoist ropes, where present.

There are no precise rules provided for retirement of wire ropes used on mining equipment based on number of broken wires per lay. Continued use depends largely upon good judgment of the inspector in evaluating the remaining strength and useful life of the rope.

However, it is considered to be good practice to consider retirement, or conduct more frequent and detailed inspections, when there are more than six wire breaks per lay or more than three wire breaks per strand, per lay. Valley breaks should be given careful consideration, as this is an indication of core deterioration.

A good practice when broken wires are found early in the rope life is to cut off the broken wires in the valley so that the wires do not come out of position and fold over and damage adjacent wires during operation. This can then lead to additional wire breaks in the same area.

The location of the broken wires should be recorded to help future inspections. Strand pendants should be removed from service when more than 30% of the outer wires or more than 10% of the total number of wires are broken. Radiographic inspection is required to detect broken internal wires. Outer wire breakage can be detected by using special inspection techniques.
Conditions that should alert the inspector to interior wire breakage are a reduction in strand diameter in an area up to 12 inches from the nose of the socket, evidence of corrosion, or corrosion at and adjacent to the socket nose.
Lubrication is important to the performance of all wire ropes and strand products used in surface mining applications. Important factors to consider are:

- A dirty rope cannot be relubricated. The rope and rope valleys must be clean so that the lubricant applied will penetrate into the core.
- The rope should be relubricated with a solvent cut back or liquid lubricant.
- Strands should be relubricated by using the lube nozzle provided in the basket of the socket to relubricate the interior of the strand at the nose of socket. An anti-wear and anticorrosion water displacing grease such as Castrol Molub-Alloy 860/220-0 ES® or equivalent lithium grease should be used for this purpose. The exterior of the strand should be lubricated with a solvent cutback or liquid lubricant in a 4- to 6-foot area adjacent to the socket.
- Used motor oil must never be used to relubricate wire rope or strands.

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THE ROPES GROUP

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