

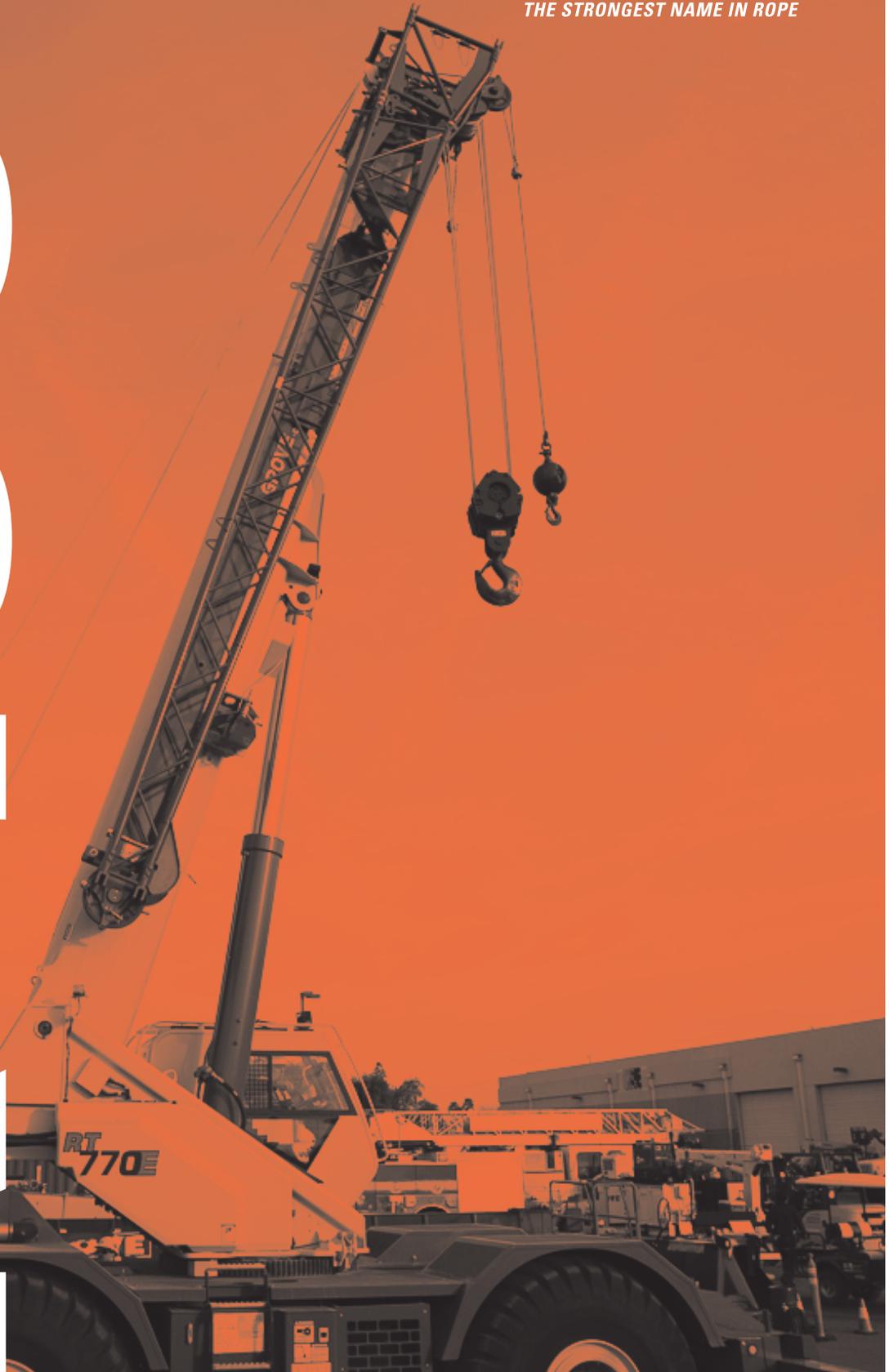
**SYNTHETIC
CRANE
HOIST LINE**



samson
THE STRONGEST NAME IN ROPE

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K-100™ Frequently Asked Questions

What is K-100?

K-100 is a synthetic rope for mobile cranes made from a combination of high-performance fibers. It offers a number of benefits over the wire rope it replaces. It is 80% lighter at similar strengths and its braided, torque-neutral construction significantly reduces load spin. K-100 is durable in bend fatigue and has robust spooling capabilities. Because K-100 is made of non-metallic fibers, it will not rust.

What is K-100 made of?

The product is made of proprietary high modulus fibers, including Dyneema®, that produce a rope with strength comparable to wire at similar diameters. These materials are much stronger and lighter than more familiar components, like polyester and nylon.



Why would I want to use K-100?

The product reduces the rope weight by 80%, providing safe handling, faster and easier change-outs, and reduced risk of back injuries. It mitigates birdcaging, kinking, or cabling from load spin.

When hoisting low load to high load, diving can occur similar to wire rope. However, this diving is reversible and typically does not damage the integrity of the rope.

How does the strength of K-100 compare to wire rope for mobile crane applications?

K-100 is specified for the crane model to allow for the same maximum permissible line pull with a 5:1 safety factor. To reach that 5:1 safety factor, the new rope is slightly larger in size but is still compatible with the existing sheave profiles.

For example, a 22 mm line of K-100 replaces a 19 mm wire rope. It works in the same sheaves and provides the same total length on the hoist drum.

How much does K-100 stretch?

Unlike ropes made with traditional fibers like nylon and polyester, K-100 is made of high-performance fibers which have very low stretch. At the max permissible line pull, the rope has an elastic elongation of 1.3%.

What are the spooling characteristics of K-100?

When installed properly, K-100 will level wind on the hoist in a method similar to wire. While the rope will naturally form to fill the void spaces on the drum, this will typically not damage the integrity of the rope and is not a permanent effect.

Diving can occur with K-100. It is most likely to occur when lower layers are spooled with minimal load, followed by high tension loading of the upper layer. It may increase the rate of wear, but diving does not compromise the strength of the rope. The frequency of this occurring can be reduced by re-spooling the rope under tension per the installation procedure.

How long does K-100 last?

This is dependent on the operating conditions and care of the rope. Because K-100 has a low susceptibility to birdcaging or cabling and kinking, replacement due to these causes will be reduced.

The life of a synthetic rope is dependent on the duty cycle, applied loads, and the application of abrasion protection measures. Fatigue testing has been completed on K-100 to simulate up to seven years of life. Testing has shown that fatigue life is three to six times greater than standard wire rope and comparable to rotation-resistant wire.

How does temperature impact the strength of K-100?

The impact of temperature on a synthetic rope is dependent on the rope's fiber. K-100 is a blend of high-performance fibers that perform quite well in a range of temperatures. Cold temperature will not reduce its strength. At temperatures below 32°F (0°C), the strength can increase up to 10%.

Elevated temperatures over 140°F (60°C) ambient will reduce the strength of K-100 to the point that it may not meet requirements for a given application.

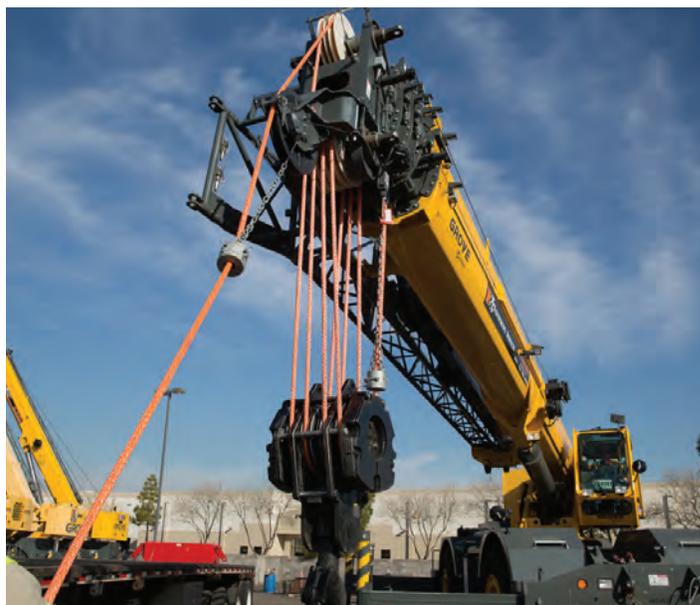
How much testing has been completed with K-100?

Evaluations for reliability testing have been conducted in laboratory settings and on cranes used on active job sites.

- Reliability testing: 36,500+ lift cycles
- Tension fatigue testing: 50,000 cycles
- Spooling, duty cycle, and calibration testing: 275+ hours
- Laboratory machine time at four different locations: 5,100 hours
- Total number of tensile break tests: 400+
- Total number of bend fatigue test samples used: 60+
- Total length of ropes used for all testing: 6+ miles
- Total lifts at customer job site: 3,000+

How are the ends of K-100 terminated?

K-100 is spliced with a soft eye on the inboard end (hoist drum side) and a thimble on the outboard end (headache ball or hook block or boom nose). The thimble allows for connection to the headache ball with a double-sided clevis adapter.



K-100™ Frequently Asked Questions

How is K-100 inspected and when should it be retired?

It is inspected and retired per Samson's inspection and retirement guidelines. See SamsonRope.com or a K-100 owner's manual for more details.

How often is K-100 inspected?

Samson recommends a minimum of one visual inspection of the working section of the line per operating shift.

Like any other rope, inspection frequency and criteria are based on application-specific considerations (i.e. duty cycle, environmental conditions, etc.) and should be determined by a qualified person on-site.

Is K-100 resistant to chemicals?

The chemical resistance of a synthetic rope is dependent on the rope's fiber. K-100 is highly resistant to acids, bases, and lubricating products typically found in the crane environment.

Solvents should be reviewed carefully.

Inquiries for specific chemicals should be addressed on a case-by-case basis and directed to Samson.

What must be done if the rope is damaged?

Contact Manitowoc Crane Care or Samson for assistance with guidelines and evaluation.

The outboard termination can be re-spliced by a qualified technician.

How much does K-100 cost?

Based on current economies of volume and the materials market, the product cost is 3 times the cost of high-end, rotation-resistant wire. This cost is offset with decreased maintenance costs and improved operational efficiency, among other benefits.

Is K-100 covered by any current standards?

K-100 strength specifications are verified in accordance with ISO 2307.

The new ASME B30.30 standard is in draft form at this time. Samson and Manitowoc are participating in developing a subsection of the standard to specifically address synthetic rope for crane applications.

K-100 is manufactured under Samson's ISO 9001: 2010 quality program.

What is the influence of UV exposure on K-100?

To quantify the efficiency of Samson's proprietary coating on K-100, accelerated UV testing was conducted, per ASTM G154: Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials. Samples were tested in various intervals of simulated Miami, Florida sun; the worst case scenario being one year of constant exposure. Tensile break tests were conducted prior to and after the simulation. Test results confirmed the rope maintained 90% of new rope strength following exposure simulating one year in Miami sunlight.

Are there any surface finish requirements for the cranes?

All contact surfaces should be free of sharp edges and have a smooth finish with surface roughness less than 300 micro inches RMS value. Reference Samson's retrofit procedure for additional requirements and information regarding surface finishes.

Can existing cranes be retrofit for K-100?

Yes, they can be retrofitted. Inspection and preparation of surfaces are required to be compatible with K-100. Contact Manitowoc Crane Care or Samson for more details.

Is K-100 "non-conductive" for use around electrical power lines?

The base fibers of K-100 are made from non-conductive materials. However, after K-100 is coated and exposed to dirt or moisture, it can conduct electricity. That conductivity will be significantly lower than steel, but proper industry procedures must be followed when working around energized power sources.

What happens if K-100 is twisted during reeving or installation?

Similar to wire rope, induced twist is not desirable and care should be taken when reeving the hook block to keep from adding twist to the line. If the twist level in the line exceeds 2 turns per meter, action must be taken to remove the twist prior to maximum load lifting operations.



How is K-100 installed?

K-100 is installed similar to wire rope. It should be installed on the hoist drum under load to get optimal packing on the bottom layers of the hoist.

K-100 is to be trained with increasing loads before heavy lifts per the process available from Samson/ Manitowoc User's Manual.

What other industries and applications are using synthetic rope technology?

High-performance synthetic slings are commonly used under the hook in many industries.

Offshore Oil and Gas

- Heavylift slings (over 300 metric tons)
- Deepwater winch lines (180 metric tons x 5,000 meters)

Mining

- Winching and recovery operations
- Dump rope in dragline operations

Mooring

- Primary mooring lines for liquid natural gas tankers

Tug

- Mainlines and pendants for harbor escort and offshore tug boats

Utility

- Stringing lines and winch lines

Commercial Fishing

- Trawl and seine lines on vessels



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THE STRONGEST NAME IN ROPE

The first synthetic line designed specifically for mobile cranes: A lightweight, safe, and reliable alternative to steel-wire rope.

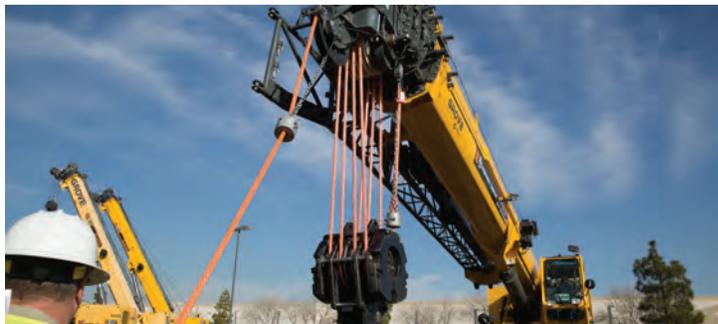


Samson has leveraged fiber, coating, and rope construction technology from multiple industries it serves to create K-100. Designed specifically for use on mobile cranes, K-100 hoist rope features high strength-to-weight ratio, bend fatigue durability, and robust spooling capabilities.

The combination of high-performance synthetic fibers provides strength similar to wire rope with over 80% in weight reduction. The high strength of these high-performance fibers allows the rope to meet the maximum line pull requirements with a 5:1 safety factor. A proprietary coating has been added to K-100 to improve rope performance in cyclic bend over sheave applications inherent on mobile cranes.

The physical structure of K-100 also contributes to its performance characteristics. The rope construction provides a firm cross section that enables efficient multi-layer spooling, prevents load spin, birdcaging, and limits permanent damage due to improper spooling.

The result is a crane hoist line that is easy and safe to handle/reeve, more durable for spooling, and can reduce weight in the overall system.



Dyneema® is a registered trademark of Royal DSM N.V. Dyneema is DSM's high-performance polyethylene product.

Nominal Diameter		Approximate Weight		ISO 2307 Strength*	
MILLIMETER	INCHES	KG/METER	POUNDS/FOOT	METRIC TONS	POUNDS
16 mm	5/8"	0.17 kg	0.11 lb	21.4 t	47,200 lb
17 mm	11/16"	0.22 kg	0.15 lb	25.6 t	56,400 lb
18 mm	3/4"	0.24 kg	0.16 lb	28.9 t	63,700 lb
20 mm	13/16"	0.27 kg	0.18 lb	32.6 t	71,900 lb
22 mm	7/8"	0.32 kg	0.22 lb	38.1 t	84,000 lb
25 mm	1"	0.42 kg	0.29 lb	49.3 t	109,000 lb
28 mm	1-1/8"	0.54 kg	0.36 lb	60.2 t	133,000 lb
30 mm	1-1/4"	0.64 kg	0.43 lb	69.9 t	154,000 lb

*Unspliced strength Max permissible line pull is calculated with a 5:1 safety factor.

FEATURES & BENEFITS

- 80% lighter than wire
- Easy handling/reeving and installation
- Reduces number of change outs due to mitigation of kinking, birdcaging, or damage from diving
- Torque-neutral construction mitigates load spin and cabling
- Corrosion resistant — no rusting, no lubing
- Reduces risk of hand injury from broken wires
- Reduced wear on drums, sheaves
- Standardizes main and auxiliary hoist to one rope
- Same load pull and load chart but with 5:1 safety factor

SPECIFICATIONS

- FIBER (CORE/COVER)** Polyester (Control Core) / High-modulus Blend
- SPECIFIC GRAVITY** 1.05
- COLOR** Orange with a black longitudinal line
- ELASTIC ELONGATION % (At % of break strength)**
 10%..... 0.9%
 20% 1.3%
 30% 1.8%
- SPLICE/CLASS** Product Specific Class II

The product name K-100 was chosen to honor Karim Ziyad. He was the pioneering Manitowoc engineer that collaborated with Samson to develop the use of synthetic hoist ropes. Karim passed away in a bicycling accident in 2013. His keen intellect and honest friendship will be fondly remembered and greatly missed.



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