

IMAGINE

the difference high performance synthetic ropes  
can make on your next project



**SAMSON**  
THE STRONGEST NAME IN ROPE

# IMAGINE

a winch line that is 1/7th the weight of wire, that's at least as strong, and provides three times the service life.

**AmSteel®-Blue** | Size for size Dyneema® 12-strand replacement for wire rope. Easy to splice and inspect in the field. Available in high-visibility colors. Our most popular high performance synthetic rope.

**Quantum-12** | A 12-strand Dyneema® fiber braid with the addition of DPX® Technology for added grip – an excellent choice for traction winches.

**Quantum-8** | Similar to Quantum-12 in an 8-strand braided construction. Firmer and rounder than 12-strand braided constructions, Quantum-8 works very well on traction winches.

**Neutron®-8** | Samson's strongest Dyneema® fiber rope design, patented 8x3 construction. This rope is a firmer construction than 12-strands but easily spliced and inspected in the field.

**Turbo-75** | Samson's premier jacketed core-dependent braid which incorporates a tightly woven Dyneema® fiber jacket (for cut and wear resistance) over a single braid core of same material. Turbo-75 is a very round firm braid which packs beautifully on a winch. Also available tapered.

## Samson high performance synthetic ropes easily outperform wire in winch based applications

In the offshore and commercial marine industries, traditional marine application engineering holds that wire rope is the preferred winch line for use on winches. Unfortunately, these very heavy strength members greatly increase handling and safety problems. Working at ultra-deep depths places even greater loads on decks, and increases size and power loads on handling equipment.

### There's a proven alternative...

Over the past 30 years, Samson has led the way in developing high modulus synthetic fiber ropes to replace wire rope in critical marine applications. In fact, Samson 12-strand braided Dyneema® mooring lines were the first to market in the early 1980's. Now employed by the largest marine fleets in the world, Samson high performance synthetic ropes have proven reliability while significantly reducing the cost of operations in towing, mooring and offshore applications.

### With increasing depths, the differences become critical...

As offshore operations move to deeper and deeper waters, the size and weight of the wire rope required becomes difficult to overcome. Size for size, Samson high performance ropes made with Dyneema® are 1/7th the weight of wire, with the same or greater strength. Many have specific gravities of <1.0 – they float. Hauling up thousands of feet of rope just got a lot easier. That means handling equipment will demand less power and deck loads are minimized. On new build construction design, the size of the handling equipment can be reduced.

### Enhanced safety, reduced maintenance...

With lighter weight comes greater crew safety. There are no fishhooks from broken strands, and maintenance is virtually eliminated. Lubrication is not required, and end for ending is a simple process. Splicing, repairs and terminations are all easily accomplished in the field without the mechanical assistance required by wire. Samson offers complete training in the field, and our reference materials for field splicing are the best in the industry.

### Samson high performance synthetics outlast wire by at least three to one...

It has been proven in actual field trials over the past ten years. Synthetic ropes made with Dyneema® have greater resistance to tension fatigue and bending fatigue than the wire they replace.

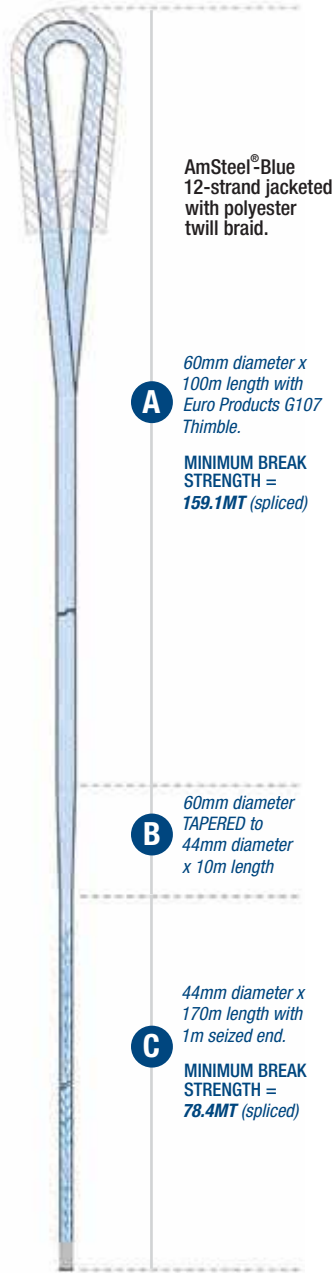
### Best of all, The Samson Advantage comes with every rope we make.

Samson offers the most complete package of service – starting before the rope is manufactured and extending until the rope is retired. Application engineers assess your application and recommend appropriate products, or help develop customized solutions to critical problems. Samson personnel assist with installations, train crews in maintenance and splicing, and provide periodic inspections to determine retirement criteria that assures the longest, safest service life in the industry. It's all part of the commitment to customer service we call The Samson Advantage.

*Deepwater lowering and lifting lines, mooring tethers, anchor retrieval lines, riser winch lines, lifting slings, tow lines and bridles all benefit from technology engineered by Samson.*

## ENGINEERED SOLUTIONS

### TECHNIP RISER PROJECT TAPERED LINE



## Samson tapered winch lines – an engineered solution designed specifically for offshore winches

### Engineered solutions...tapered lines without the headaches of terminations











At Samson, we take pride in our commitment to provide reliable, uniquely engineered solutions to difficult problems. Creating strength members for use on offshore projects, where the cost of delays caused by component failure is extraordinarily high, is a job where both manufacturing expertise and engineering experience play important roles. Samson's application engineers, working together with our R&D team have developed a process by which long continuous lengths of rope can be manufactured with integral tapered sections. The result retains all the lightweight and flexibility of high performance synthetic ropes without the problems. Terminations, swivels, or shackles complicating use on winches are not required.

Tapered strength members have been used to reduce weight in long wire ropes used for many applications. The inevitable stress placed on the wire at the termination point and uneven winding on the winch reel have been problematic in many installations. Samson engineers have perfected braiding high performance synthetic ropes in extremely long lengths and tapering in the process. This results in a single length of rope, without terminations, engineered to your specifications. No shackles or bulky splices to cause fatigue failure points or foul winch drums.

Quantum-12  
AmSteel®-Blue  
Turbo-75

## COMPARISON

SYNTHETICS VS. WIRE ROPE

STRENGTH	WEIGHT	FATIGUE RESISTANCE	CAPEX	OPEX*	TRANSPORTATION	EQUIPMENT	SERVICE LIFE**	MAINTENANCE	DURABILITY
									
<b>Strength</b> Size for size, it is just as strong as the wire it replaces.	<b>Weight</b> Dyneema® weighs 1/7th the weight of wire that it replaces. Neutrally buoyant – floats.	<b>Fatigue Resistance</b> Greater resistance to flex fatigue and CBOS than wire. Unaffected by saltwater.	<b>CAPEX (Capital Expenditure)</b> The initial cost is where wire shines. Factor in a service life more than 3 times longer, reduced maintenance costs and impact on equipment, any savings are completely offset.	<b>OPEX (Operational Expenditure) Installation Costs</b> Lighter weight is easier to handle, reduced hardware cost	<b>Transportation Costs</b> Lighter weight allows smaller handling vessels and machinery, fewer trips to transport.	<b>Equipment Costs</b> Lighter weight allows smaller winches, decreased deck loads and energy demands.	<b>Service Life</b> Dyneema® typically outlasts wire by a factor of 3.	<b>Maintenance Costs</b> No lubing, chemicals or spooling trucks required. Easy end-for-ending and in the field/on the spool splicing.	<b>Durability</b> Strength remains the same wet or dry. Dyneema® ropes are also abrasion resistant and resistant to most chemicals.
Dyneema®   High Wire   High	Dyneema®   Low Wire   High	Dyneema®   High Wire   Low	Dyneema®   High Wire   Low	Dyneema®   Low Wire   High	Dyneema®   Low Wire   High	Dyneema®   Low Wire   High	Dyneema®   Longer Wire   Shorter	Dyneema®   Low Wire   High	Dyneema®   High Wire   Low

\*Operational costs are difficult to quantify precisely without actual data in the specific application to audit, but important to factor into decisions. Transportation costs are a good example. While smaller vessels are less expensive to operate, fewer trips with larger vessels also impact the cost – just in a slightly different way. Either way, lighter weight, higher strength lines mean reduced operational costs.

\*\*While service life varies with the actual application and the environmental conditions of the installation, experience has shown that synthetics outlast wire by an average of three times. Some users report much longer service life.



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

## A CASE IN POINT: Technip's Enfield Riser Project

Installation of the world's largest riser column at the Enfield oil field development site off the coast of Exmouth, Australia was halted due to problems with the wire used as a pull-in winch line for installation of the risers. The column's design used special angled flow tubes to shorten the catenary required for the riser tubes. The wire caused abrasion damage to the flow tubes at the bend. Installation was halted until a solution was found.

Samson was contacted for a solution that would eliminate the problem while keeping the installation on schedule. The result was a custom engineered 12-strand Dyneema® braid, tapered to conform to the loads anticipated. The lines were jacketed with polyester, and master links were spliced into the ends, ready for use on the project. In-house testing was performed to confirm that the smaller than originally specified D/d ratio would be acceptable to the engineers at Technip.

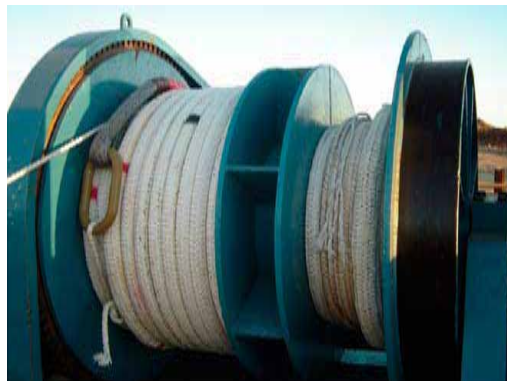
The result: installation was completed on schedule, with the tapered lines meeting all expectations and surviving the installation process with only minimal abrasion to a small section of the cover jacket.



Enfield riser column.



Installation of riser.



Tapered AmSteel®-Blue with polyester jacket winch line – 60mm diameter tapering to 44mm diameter with master links spliced in.



Quantum-8 being installed on FPSO Excelsior.



Quantum-8 at work.

## Tapered STL buoy pull-in lines for a traction winch on the FPSO Excelsior...

Recently, Samson engineered a tapered rope to replace the pull-in line for the STL buoy on the FPSO Excelsior operated by Skaugens Marine. The rope used was a specially tapered version of our standard Quantum-8 product. An 8-strand constructed using Samson's DPX® technology that incorporates polyester fibers into the surface stands for increased grip without compromising the strength of the Dyneema® fiber. In addition, Samson AmSteel®-Blue was used to replace the buoy's bridle during the installation.

A Samson application engineer, spent a week aboard the Excelsior to ensure that installation went smoothly and to train the crew on the use and maintenance of the synthetic rope.

If you would like to explore the options of using high performance synthetics on your next project, give us a call. A Samson application engineer will recommend products or assist in developing a custom solution for a critical application.



**samson**  
THE STRONGEST NAME IN ROPE



# IMAGINE...

a winch line that reduces installation and operating costs by offering longer, more reliable service life.

being able to significantly reduce deck loads on your next design.

being able to specify a single length of rope to replace multiple lengths of different diameters with connectors.

less chance of damage to expensive equipment like risers.

a safer workplace where maintenance and lubricating wire ropes is a thing of the past.



## Samson offshore high performance synthetic ropes – the clear performance choice over wire rope

### Reduce deck loads by significantly reducing the total winch system weight...

Comparing systems with the same capacities, Samson high performance winch lines significantly reduce total deck loads. For a typical winch system with 300MT line pull, using 4-inch diameter lines, 150m in length, there is a 30% reduction in the weight of the winch alone using Samson high performance synthetic ropes.

*That's before factoring in the weight of the rope itself.*

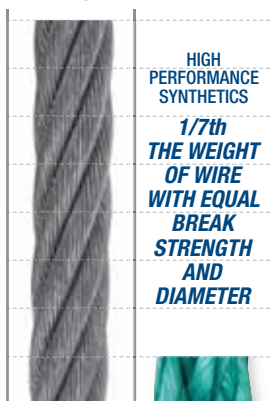
Add in the weight reduction of the winch line itself and you've got a significant reduction in the total deck load of the winch system.

150M x 4-inch diameter  
WIRE ROPE = 6,300kg

150M x 4-inch diameter  
SAMSON NEUTRON<sup>®</sup>-8  
HIGH PERFORMANCE  
SYNTHETIC ROPE =  
801kg

**WEIGHT SAVED:**  
5,499kg (a little over 6 tons)

### 150m by 4-inch diameter

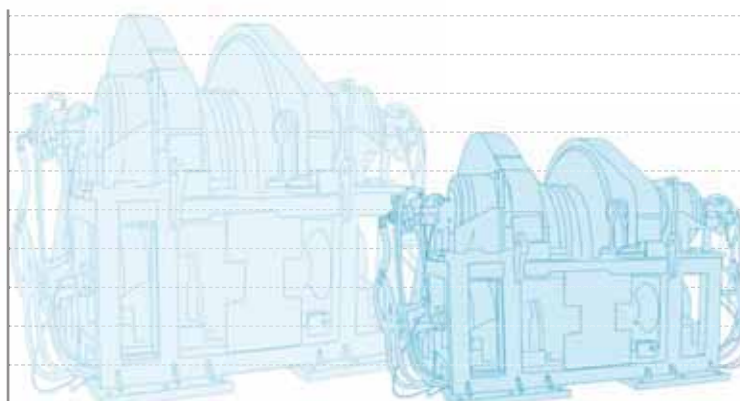


WIRE  
ROPE WEIGHT  
6,300kg

HIGH  
PERFORMANCE  
SYNTHETICS  
**1/7th  
THE WEIGHT  
OF WIRE  
WITH EQUAL  
BREAK  
STRENGTH  
AND  
DIAMETER**

NEUTRON<sup>®</sup>-8  
ROPE WEIGHT  
810kg

### 300MT LINE PULL WINCH WEIGHT



WINCH OPERATING WITH WIRE ROPE  
30% HEAVIER

WINCH OPERATING WITH SAMSON  
HIGH PERFORMANCE SYNTHETIC ROPE  
30% LIGHTER

### Benefits of synthetics over wire winch lines

- > Reliable strength and performance
- > Lightweight and flexible
- > Reduced maintenance costs
- > Longer service life
- > Better bend fatigue
- > Safer, easier handling