WARPS

Fiber Winch Warps

HAMPIÐJAN

– a worldwide network

COMPANY PROFILE

In the spring of 1934, midst in the Great Depression, 13 individuals gathered a small fortune to start up an industrial company to manufacture fishing nets, ropes and fishing long lines for the Icelandic fishing fleet.

Hampidjan has since evolved to become one of the largest fishing gear and high tech ropes manufacturer of the world, having 35 entities in 12 countries with over 900 employees.

We have made relentless product development the essence of our being. We do that so our customers know that if they are with Hampidjan, using advanced DynIce and DynIce Dux ultra high performance ropes for towing or tugging – they are using products that are at the cutting edge of known technology.

The Hampidjan Group headquarters are located at the waterfront of the main harbor of Reykjavik Iceland in a new 6.500 m2 building.

The main production facility is Hampidjan Baltic in Lithuania. The production range is from filaments to the most advanced tailor made fishing gear available as well as high performance ropes. The production equipment is state of the art and on floor area of 21.500 m2

MANAGEMENT SYSTEM CERTIFICATION
DNV·GL
ISO 9001 = ISO 14001
OHSAS 18001

Hampidjan is ISO 9001 certified for quality assurance, ISO 14001 certified for environment issues and OSHAS ISO 18001 certified for health and safety of the employees. Certification is from DNV – Det Norske Veritas.

WITH Dyneema®

Technora®

The vessel photo on the back page and related photos inside the brochure are published with the courtesy of Seabed AS.

FIBER WINCH WARPS

Specialized high performance DynIce Warp ropes for extreme deep sea lowering and lifting.

DynIce Warp is the most advanced patent pending and complex design of a winch line for deep sea lifting and lowering as well as for towing fishing trawls. The rope consists of 6 different layers to make the line with very high cross-sectional stability and axial stiffness.

Wire ropes have limitations due to own weight and at extreme depth the weight of the wire itself exceeds the working load limit. DynIce Warp has no such limitations as the rope is lighter than water and floats even though the strength exceeds the strength of wire rope of same diameter. It is excellent choice as winch wire rope replacement.

DynIce Warp is a heat set and stretched rope with plastic core to ensure firmness and roundness and a durable cover of Dyneema® overbraid is moulded on the main rope. The main strength member and the cover is braided ensuring that the rope is totally balanced and torque free and will not untwist at any load.

The density is 0,96 and the rope is floating but if needed the density can be adjusted up to 1,20 to ensure that the rope is sinking.

DynIce Warp is proven to use on drum winches both in fishing and offshore and is very suitable for traction winches.

DynIce Warp				
Overall diameter	**Breaking strength unspliced**	**Weight in air**	**Weight in sea**	**Density**
mm	*ton*	*kg/m*	*kg/m*	*kg/dm3*
12	12	0.110	-0.009	0.96
14	18	0.141	-0.011	0.96
16	25	0.184	-0.015	0.96
18	31	0.219	-0.018	0.96
20	39	0.295	-0.024	0.96
22	44	0.318	-0.026	0.96
24	47	0.384	-0.031	0.96
26	56	0.439	-0.035	0.96
28	65	0.523	-0.042	0.96
30	74	0.576	-0.046	0.96
32	83	0.662	-0.053	0.96
34	91	0.710	-0.057	0.96
36	99	0.804	-0.065	0.96
38	107	0.863	-0.069	0.96
40	115	0.915	-0.073	0.96
42	134	0.979	-0.079	0.96
44	142	1.043	-0.084	0.96
46	146	1.155	-0.093	0.96
48	157	1.229	-0.099	0.96
50	169	1.311	-0.105	0.96

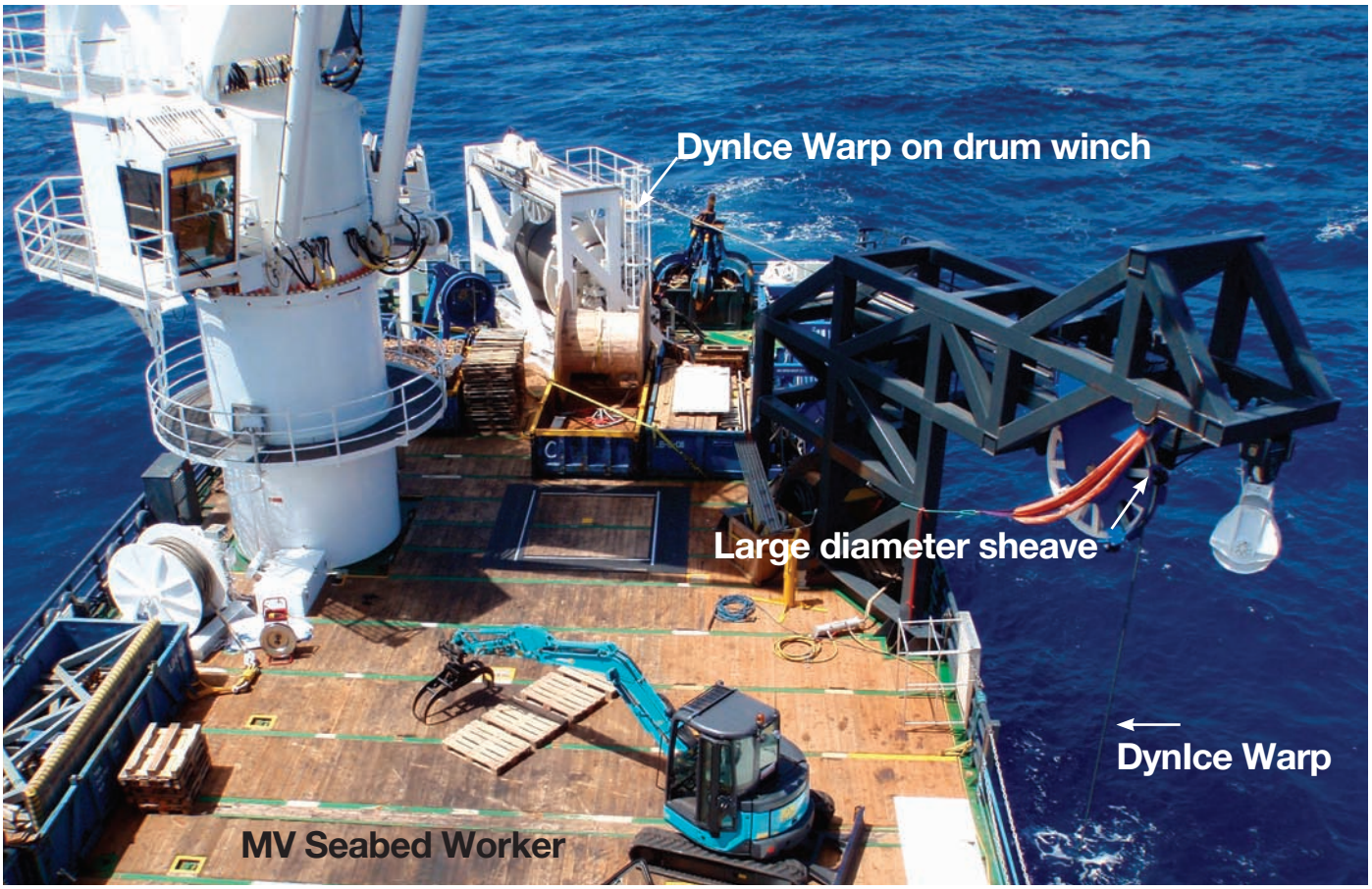
Material strength member	Dyneema SK 75
Material cover	Dyneema SK 62
Basic rope construction	2 x 12
Torque	None
Density	0,97 - 1,20 g/cm3
Colour	Upon request
Modulus	36 kN/mm^2
Elongation at break	3.70%
Melting point	144-152°C
Max working temperature	65°C
Resistance to chemicals	Excellent
Shrinkage in cold water	None
Water absorption	Almost none
UV resistance	Very good
Abrasion resistance dry	Very good
Abrasion resistance wet	Very good
Flexibility	Good
Fibre resistance to alkalis	Excellent
Fibre resistance to acids	Excellent
Fibre resistance to most chemicals	Excellent

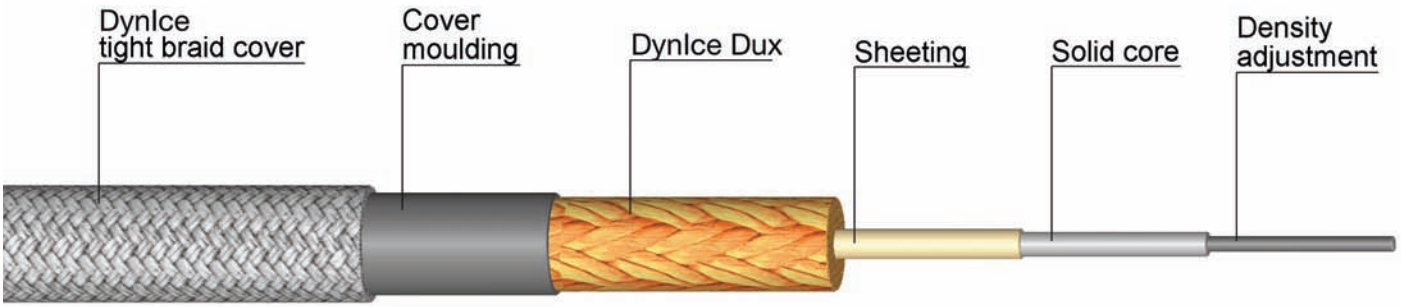
DynIce is Hampidjan´s trademark for ropes made from Dyneema fibers, from DSM Dyneema. DynIce ropes are impregnated 12 strand ropes, with or without cover and core. There are several grades of Dyneema raw material, and different impregnations, each intended for specific uses.

Dyneema fiber is a high-strength, high-modulus polyethelyne fiber that combines excellent mechanical properties with low density, resulting in high performance-on-weight basis and stronger than steel ropes in the same diameter.

WITH Dyneema®

MV SEABED WORKER





The DynIce Warp has similar strength as steel wire in same diameter and the axial stiffness is very high or about half of the steel wire stiffness and elongation at break is around 3,5%.

The construction of the DynIce Warp makes it the most advanced high tech rope design available. There are two separate and individual patents pending for this unique high performance rope.

MV Seabed Worker is equipped with DynIce Warps on a standard winch for operations down to 6.300 meter for salvage operations. The operation would barely have been feasible with steel wire on the winch. The DynIce Warp of 44 mm holds the same strength as a steel wire in same diameter.

This particular DynIce Warp has been given a density of 1,1 and has therefore submerged weight of 1460 kg at 6.300 m.

POWER WARPS

Electrical conductivity with extreme pulling power.

Hampidjan´s DynIce Coaxial Winch Warps are the most advanced high performance winch ropes from synthetic fibers available today, with their unique tight construction and stiffness resembling steel wire. They are also carefully protected under a jacket that is bonded to the strength member.

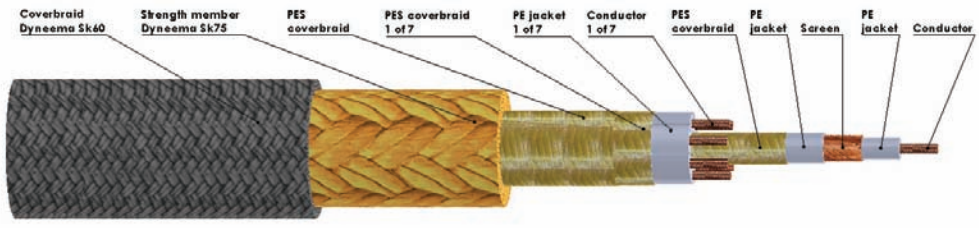
The Winch Warps have been used in over 200 projects all over the world, from fishing and Oceanographic vessels, on offshore winch systems, in salvage operations and where quality engineered solutions are of importance.

The Warps have proven to be easy to spool, just as steel wire, and have comparable strength per diameter as steel wire as well.

The sunken F-1 motors of the Apollo 11 space shuttle were successfully recovered from 4200 meters outside the Florida cost, of course using DynIce Winch Warps.


Courtesy of Bezos Expeditions

Denith Engineering in Cape Town designed a system with DynIce Winch Warp for salvage operations at 6.000mtrs, the proven track record of the DynIce Winch Warps and the tight construction were the main selection criteria.



DynIce rope are based on Dyneema® Ultra High Molecular Weight Polyethelyne or UHMWPE, often abbreviated HMPE, that have all the benefits of Dyneema in addition to advanced engineering from Hampidjan.

They are very abrasion resistant, lightweight and strong. They are easy to splice and are available in various different constructions tailored to different needs.

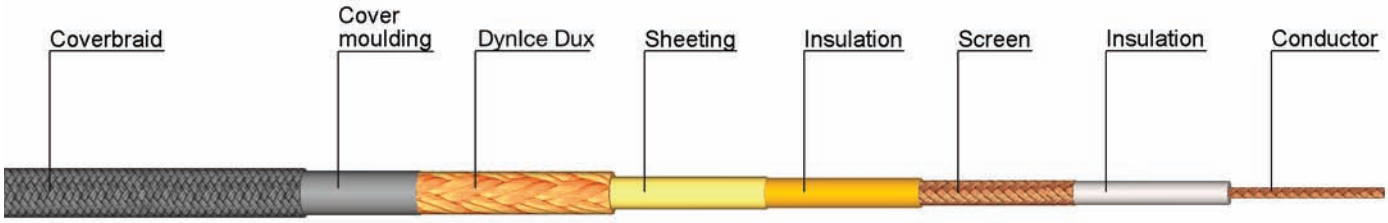
DYNICE CTD CABLE

Lightweight data transfer cable for deep sea operations.

DynIce current-temperature-depth (CT) cables are Dyneema based single conductor coax (or fiber) cables. They are a new alternative to current metal based cables, providing neutrally buoyant, lightweight data transfer cables for oceanographic operations.

The DynIce CTD cables are designed to work on drum or traction winches.

The length limitation for DynIce CTD cables in one continous lenght is 9 km.



DynIce CTD					
Overall diameter	Breaking strength unspliced	SWL at 5:1	Density	Weight of cable in air	Weight of cable in sea
mm	*ton*	*ton*	*kg/dm3*	*kg/m*	*kg/m*
12.4	7.5	1.4	1.35	0.163	0.038
13.6	9.5	1.7	1.25	0.181	0.030

Copper conductor	2,19 mm2
Copper screen with >95% coverage	4,17 mm2
Resistance of conductor	11,0 ohm/km
Resistance of screen	5,7 ohm/km
Impedance	41 ohm
Capacitance	151 pF/m
Attenuation at 40 kHz	0,023 dB/km

The DynIce CTD was originally designed for transmission of sonar signals from headline sonar on advanced fishing trawls.

The headline sonar is placed on the top front of the trawl. Besides sending the sonar data it is receiving remote signal from catch sensors in the aft end indicating how much fish has been caught. The DynIce CTD cable used for this purpose is one length of up to 3000 meters.

TECICE WINCH WARPS

Heat resistant warps for demanding applications.

Hampidjan´s patented Technora Winch Warps are tightly constructed ropes made from Technora fibers, with Technora cover bonded on the strength member for added wear protection.

The Warps are designed to operate on winches where high temperature is a concern.

The construction is the same as for our other Warp ropes, they are heat set with a core to increase stiffness and to help the rope mantain its circular shape, even under load.
A custom impregnation is used to increase the life of the rope in cyclic bending situations (CBOS).

The density of the rope is 1.4 so it will slowly sink, but it is still lightweight and has about the same strength per diameter as steel wire.

Technora ropes are made from Technora fiber from Teijin Aramid.

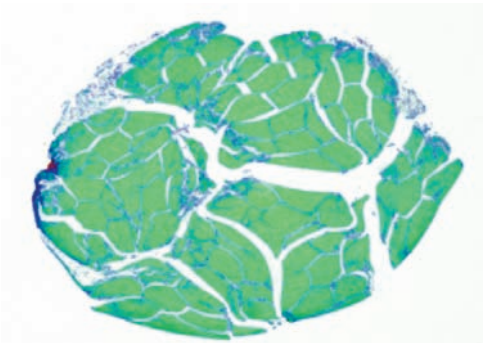
They are lightweight compared to steel wire, tolerate heat up to 500°C for a short amount of time, or 200°C for an long periods, they have almost no creep and good fatigue resistance even after long period under high load.

Technora®

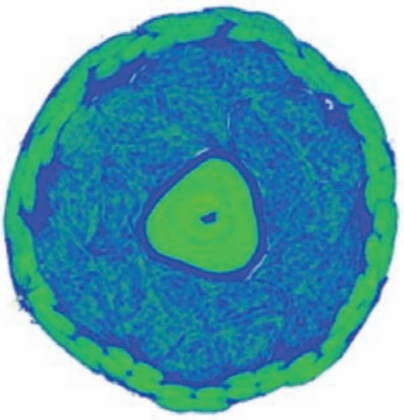
TECHNICAL

Material selection on strength members, impregnations and cover materials if used, are of critical importance.

The construction of a rope that is exposed to abrasion from bends and external material is at least as important as material selection. It is possible to minimize the internal abrasion which results in heat build-up, which is a significant factor in lifetime of fiber ropes, with the correct construction.

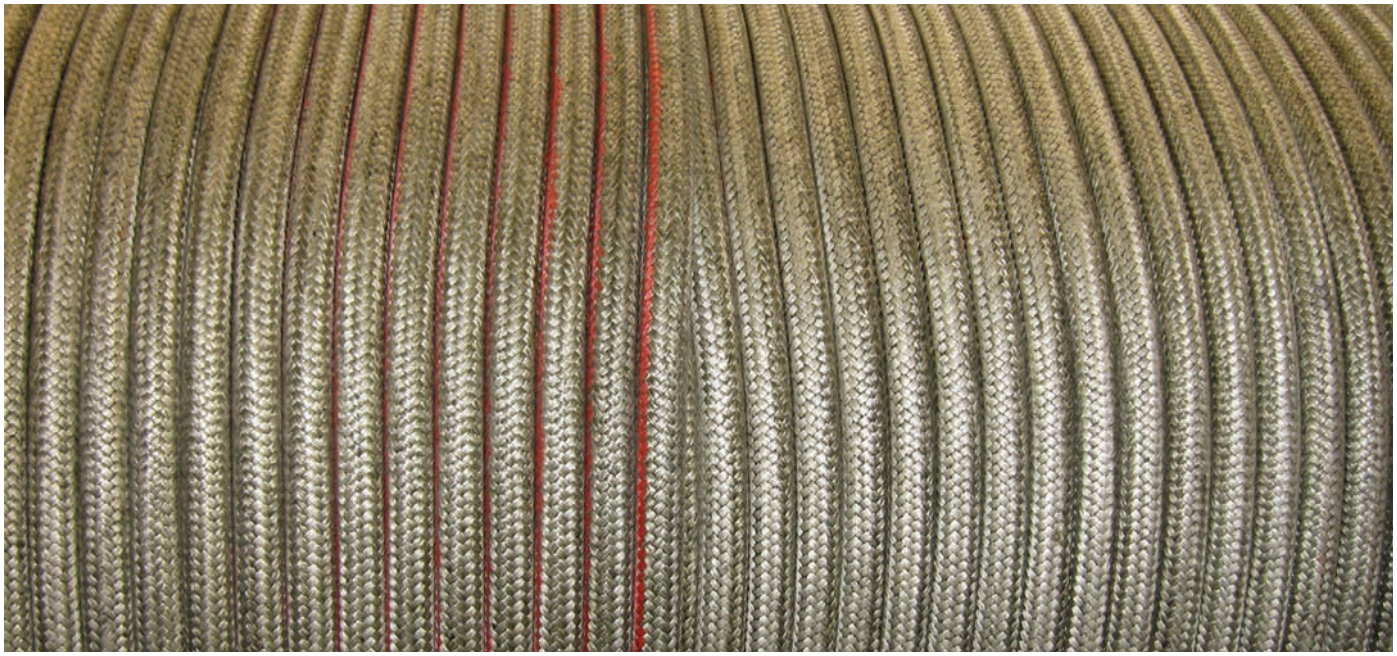


“Cat-Scan picture of a DynIce SK78 fiber rope after 40.000 cycles in 3rd party testing. Important internal abrasion, less than 80% of orginal breaking strength of the rope was measured after testing.



“Cat-Scan picture of a DynIce® Winch Warp rope after 152.000 cycles in 3rd party testing, even after more than 90.000 cycles more than the standard rope, the DynIce® Winch Warp still had over 90% of its original breaking strength left.

Testing details are available upon request.



Visual inspection

Visual inspection of fiber ropes can give an indication of the status of the rope but it ultimately depends on many different factors like the quality of the inspector, length of the rope, if the rope is damaged on the inside or if the damage is visual at all. Visual inspection cannot give an indication about the main failure mode of Dyneema ropes used in active heave compensated mode, which is localized creep. Localized creep can be such that it is not visible at all and therefore a visual inspection cannot be considered a trusted method for larger ropes.

TECHNICAL

DynIce Winch Warps in various industries

The DynIce Winch Warps was originally designed to work on fishing vessels, it is on use on over 200 fishing vessels around the world where it has replaced steel wire as the main towing rope, it has been on the market for 15 years, the longest serving rope still in use has been in use for 11 years, and is still being used every day.

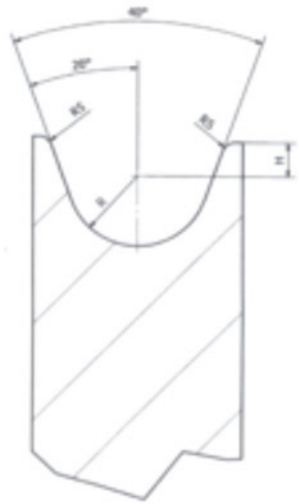
R/V KAIMEI

DynIce Winch Warps have become the major ropes of choice for coring applications in the Oceanographic industries where it has over 90% market share.

DynIce Winch Warps are also in use in other industries such as offshore oil and gas, the installation market for wind farms and in dredging operations.

Recommended sheave profile

Sheaves should be U-shaped and about 10% larger than the rope diameter, the block should be preferably 10X the diameter of the rope There are special considerations for running sheaves for fiber rope. The recommended sheave groove design is as follows:



It is of critical importance for fiber ropes to minimize the abrasion to the flanges of the sheaves, and therefore the heat build-up, by using the correct construction.

Different setups have different needs. It can beneficial to have a high coefficient of friction for spooling, in other cases it is better to have a low coefficient of friction. It is possible to blend in various materials in the cover of DynIce Winch Warps and increase or decrease the coefficient of friction. DynIce Winch Warps with DynIce cover will develop fluffy surface during ordinary use. This is normal and does not affect abrasion resistance or change the coefficient of friction.

Coefficient of friction

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TECHNICAL

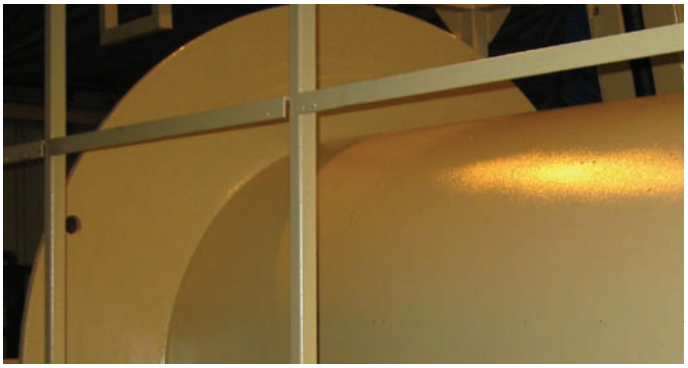
Spooling

Clausthal University has proven after extensive testing that DynIce® Winch Warps “exhibit good spooling behavior on the wire rope drum due to the stable design of the braided rope with a core, cover braid and heat setting. The other ropes, standard fiber ropes, fitted the selected drum less well, which results in a disturbed winding pattern. For these ropes it would be necessary to adapt the surface geometries on the drum casing and flange wheels.*“

* The influence of high performance fibre rope designs on drum load and spooling performance in multi-layer drum equipment- OIPEEC Conference – La Rochelle – April 2017

Tensioning

As high tension as possible should be used when Hampidjan´s Fiber Winch Warps are wound on a drum, or at least 2% of the WLL. Avoid over tensioning, as that will only increase the flange load without improving the behavior of the Fiber Winch Warp on the drum.



Surfaces of sheaves and drums for DynIce Winch Warp should be from either stainless steel or potted steel, free from sharp edges. It is recommended to use flat surface on the drum, to spool the first layer carefully and to compact the spooling correctly. Lebus groves can be used, but are not required or recommended.

Coefficient of friction

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Storage of fiber winch warps

- Do not store in excessive hot storages where the temperature is above 60°C for a prolonged time. Containers for transport in hot areas can become very hot inside in direct sun.
- Avoid storing or letting the rope rest on hot surfaces.
- Store without having too high tension from winding on the reel.
- Avoid storing in direct sun as that could overheat some part of the rope. Dark surfaces in direct sun can get extremely hot and damaging

TECHNICAL

Covers

Covers on fiber ropes protect the strength member, keep rust, sand, salt, dirt and other particles away from the strength member, take the abrasion and greatly affect the lifetime of the delicate fiber. However, there is a problem spooling fiber ropes with covers as the different tension in the cover and the strength member often mean that the cover slides and creates a problem in spooling.

Open construction, not optimized for spooling, easy access for particles, flattens out under load

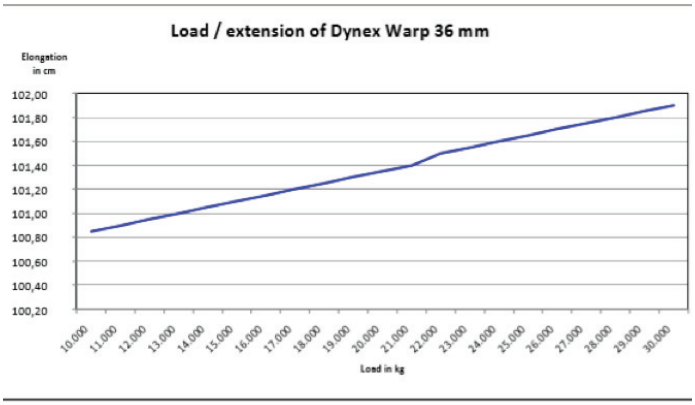
This is why Hampidjan has invented a method, a patented technology, to make the cover and the strength member a single unit, meaning that you can get all the benefit of the cover and can still spool the rope as a normal rope. The cover also acts as a particle filter, further ensuring extended lifetime.

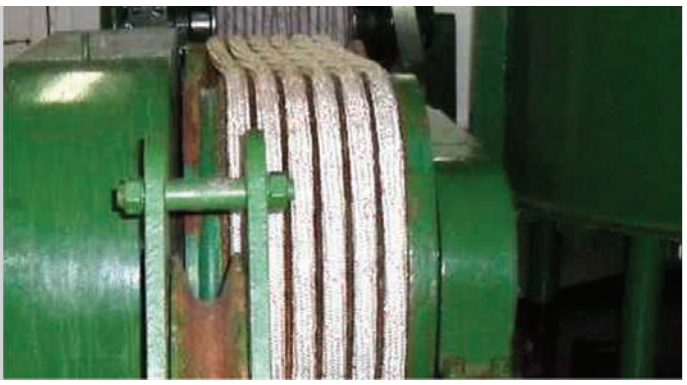
The cover is moulded on top of the rope with new patent pending technology. The bonding between cover and core enables force transfer from the cover and into the rope which is the main strength member. Additionally the bonding prevents the cover from moving or slipping on the rope. Friction coefficient between rope and sheave is increased with texturized and rather fluffy cover surface.

Modulus of elasticity for DynIce® Winch Warp

Modulus of elasticity is well know mechanical property that measures the stiffness of a material and defines the relationship between stress and elastic strain.
For long time Modulus of elasticity has been calculated for steel wire and accordingly the method has been standardized, ISO 12076. This standard can be used to calculate the Modulus of elasticity for fiber rope but in case of DynIce Winch Warp one must consider that, opposite to steel wire, not all parts of the rope carries load and since the rope cross sectional area is used in calculations it is important know that inherently the modulus will be lower for highly engineered ropes like DynIce Winch Warp compared to simple ropes.

When ISO 12076 is used to calculate the modulus for Ø36mm rope based on actual diameter the results are E=27,6 GPa but without the cover it is E=36GPa.





TECHNICAL

Splicing of Warps

One of the main benefits of fiber ropes in general is that qualified personnel can splice them quite easily. Fiber Winch Warps are also easily spliced, it is possible to splice a new end termination to a used rope, to add an extra 2.000mtrs to an existing rope and it is also possible to shorten ropes. Hampidjan offers splice courses where participants are issued with certification after the termination of the course. All new Fiber Winch Warps come with a splice kit.
It is also possible to repair a damaged cover on any kind of Hampidjan´s Fiber Winch Warp.

Density of Fiber Winch Warps

The density of Hampidjan´s Fiber Winch Warps varies based on material selection in core and in cover. A Fiber Winch Warp from DynIce has a density of 0,97 kg/dm3, but due to the construction of the Fiber Winch Warps, we can increase the density up to 1,2 kg/dm3, practical in operations where the rope should sink slowly. Fiber Winch Warps with Technora as the strength member have a higher density, or around 1,44kg/dm3.

Termination of Fiber Winch Warps

Hampidjan´s Fiber Winch Warps can be terminated like steel wire, with a clamping system inside the drum. It is also possible to splice an eye on the inner end of the rope and secure the eye inside the drum. Other options are available.

Retrofit

Hampidjan´s Fiber Winch Warps have been used to replace steel wire on many occasions. It is possible, with the correct preparation of drum and sheave surfaces, to put Fiber Winch Warps onto existing cranes and winches. Consult with Hampidjan Offshore for further information.

End terminations

DynIce Winch Warps can be terminated with a plain end, with a stainless steel thimble and with soft eyes.

DYNICE DEEP SEA ROPES

Large diameter DynIce Deep Sea ropes for heavy lifts and extreme deep sea lowering and lifting.

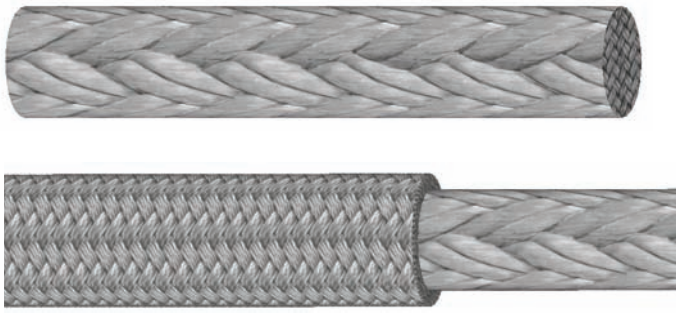
The need for large diameter ropes in very long lengths is increasing as drilling and installation is today feasible at depths down to 3000 meters in certain areas. At such depth it becomes practically impossible to work with steel wire ropes due to their own weight.

Synthetic ropes from high performance materials like Dyneema® are then a good alternative as they are lighter than water and floating.

For the production of DynIce Deep Sea ropes the largest 12 strand braider built in the world is used for that purpose.

The rope is available as a 12 strand braid with durable impregnation and with either cover of polyester or Dyneema, or a blend of those materials.

Diameters range up to 200 mm and with overall diameter with cover up to 220 mm and breaking strength of 2.500 tons.



DynIce Deep Sea

Diameter under 5% load	Breaking strength unspliced	Weight in air	Weight in sea
mm	*ton*	*kg/m*	*kg/m*
40	139	0.95	-0.07
42	150	1.02	-0.08
44	161	1.09	-0.09
46	171	1.17	-0.10
48	182	1.24	-0.10
50	193	1.32	-0.11
52	214	1.46	-0.12
54	236	1.61	-0.13
56	257	1.76	-0.14
58	278	1.90	-0.15
60	299	2.05	-0.16
62	320	2.19	-0.18
64	341	2.34	-0.19
66	362	2.49	-0.20
68	382	2.63	-0.21
70	403	2.78	-0.22
80	516	3.58	-0.29
90	648	4.54	-0.36
100	798	5.63	-0.45
110	957	6.80	-0.55
120	1,124	8.05	-0.65
130	1,318	9.51	-0.76
140	1,508	10.97	-0.88
150	1,706	12.51	-1.01
160	1,940	14.34	-1.15
170	2,151	16.17	-1.30
180	2,277	18.00	-1.44
190	2,421	20.12	-1.61
200	2,554	22.31	-1.79

Steel wire rope 56 mm - MBL 264 ton
SF 7 = Working Load Limit 38 ton
Weight on deck 41 ton

DynIce Deep Sea 56 mm - MBL 266 ton
SF 7 = Working Load Limit 38 ton
Weight on deck 6 ton

At 3.000 m depth steel rope weighs 37,2 ton but DynIce has a buoyancy of 0,46 ton!

DECK ROPES

High performance ropes for various applications with high strength and durability.

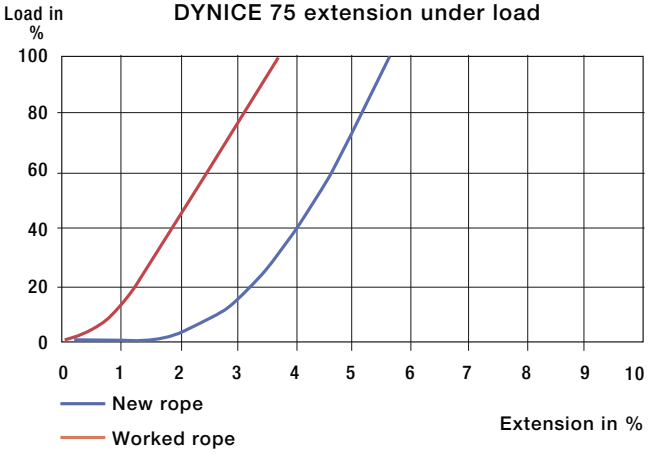
DynIce 75

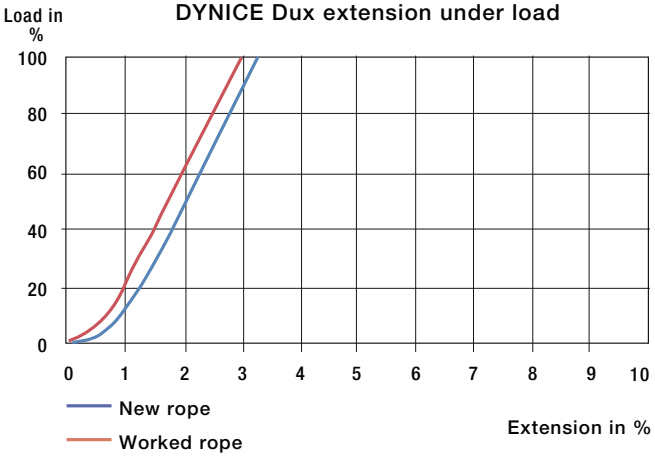
Reliable and proven 12 strand braided rope from Dyneema SK75 fibres impregnated with Duracoat for improved abrasion resistance.

The ropes are soft and flexible and easy to splice.

DynIce Dux

DynIce Dux is very firm, heatset and stretched 12 strand Dyneema SK75 rope with smooth Durapur impregnation for abrasion resistance.
The constructional elongation has been removed in the production process and stretch is extremely low.





Diameter	Breaking strength unspliced	Breaking strength with eye	Weight in air	Weight in sea (floating)	Density
mm	*ton*	*ton*	*kg/100 m*	*kg/100 m*	*kg/dm3*
6	4.2	3.8	2.30	-0.18	0.96
8	6.7	6.0	3.80	-0.30	0.96
10	10.7	9.6	6.10	-0.49	0.96
12	16.4	14.8	9.30	-0.75	0.96
14	21.8	19.6	12.50	-1.00	0.96
16	27.4	24.7	16.00	-1.28	0.96
18	35.0	31.5	20.70	-1.66	0.96
20	41.9	37.7	25.20	-2.02	0.96
22	50.0	45.0	30.50	-2.45	0.96

Diameter	Breaking strength unspliced	Breaking strength with eye	Weight in air	Weight in sea (floating)	Density
mm	*ton*	*ton*	*kg/100 m*	*kg/100 m*	*kg/dm3*
6	6.8	6.1	3.28	-0.26	0.96
8	9.9	8.9	4.92	-0.39	0.96
10	13.5	12.2	6.80	-0.55	0.96
12	18.8	16.9	9.70	-0.78	0.96
14	27.3	24.6	13.60	-1.09	0.96
16	37.2	33.5	18.60	-1.49	0.96
18	45.1	40.6	22.60	-1.81	0.96
20	54.7	49.2	27.40	-2.20	0.96
21	64.2	57.8	32.10	-2.57	0.96
23	73.6	66.2	37.00	-2.97	0.96
25	82.7	74.4	42.10	-3.38	0.96
27	90.6	81.5	46.80	-3.75	0.96
29	98.9	89.0	51.70	-4.15	0.96
31	107.1	96.4	56.70	-4.55	0.96
32	115.3	103.8	61.70	-4.95	0.96

CERTIFICATIONS

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

UAB HAMPIDJAN BALTIC

Pakruojo g. 34, LT-76126 Šiauliai, Lithuania

has been found to conform to the Quality Management System standard:
ISO 9001:2015

This certificate is valid for the following scope:

PRODUCTION OF MONOFILAMENT, BRAIDING AND TWISTING TWINES, NETS, ROPES AND TRAWLS.

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

UAB HAMPIDJAN BALTIC

Pakruojo g. 34, LT-76126 Šiauliai, Lithuania

has been found to conform to the Environmental Management System standard:
ISO 14001:2015

This certificate is valid for the following scope:

PRODUCTION OF MONOFILAMENT, BRAIDING AND TWISTING TWINES, NETS, ROPES AND TRAWLS.

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

UAB HAMPIDJAN BALTIC

Pakruojo g.34, LT-76126 Šiauliai, Lithuania

has been found to conform to the Occupational Health and Safety Management System standard:
OHSAS 18001:2007

This certificate is valid for the following scope:
PRODUCTION OF MONOFILAMENT, BRAIDING AND TWISTING TWINES, NETS, ROPES AND TRAWLS.

MANAGEMENT SYSTEM CERTIFICATION
DNV·GL
ISO 9001 = ISO 14001
OHSAS 18001

Hampidjan is ISO 9001 certified for quality assurance, ISO 14001 certified for environment issues and OSHAS ISO 18001 certified for health and safety of the employees. Certification is from DNV – Det Norske Veritas.

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