Wind Energy

Engineered Synthetic Installation Slings

CORTLAND™
A CORTLAND INTERNATIONAL COMPANY

Lifting Specialists









To harness the wind better, get it up in the air faster

When trying to meet the technical lift specifications of larger and more challenging lifts, synthetic lifting solutions surpass traditional steel wire sling solutions through strength, weight, handling, and storage efficiencies.

As an originator of fiber braiding and rope sling technology, our company has more than 25 years of experience engineering certified synthetic lifting sling solutions. We are the only fabricator offering the combination of:

- **high tenacity Cortland Selantic® round slings**
- **high tenacity Cortland Plasma® braided rope slings**

The challenges are to understand the critical areas of the lift, and then to design the solution correctly. Our success is based on a complete engineering package, involving:

Client Interface Our engineering team can assist or lead discussions in selecting an appropriate product to ensure an optimal solution is reached.

Product Knowledge The Cortland engineering team possesses in depth knowledge of the various material properties and all the associated benefits and restrictions related to each specially designed and manufactured product.

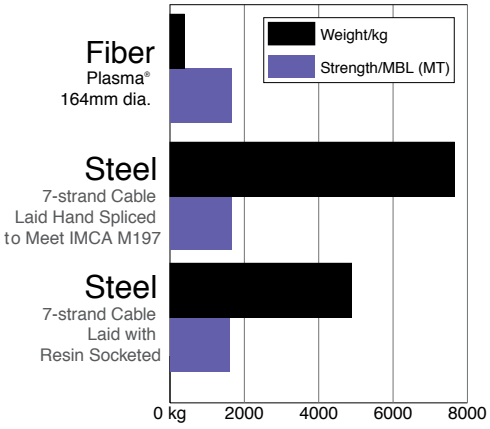
Design We have the engineering capability to assess an application and design a custom synthetic fiber solution or modify an existing product to suit individual or specialized applications.

Lift Studies Cortland has the engineering capability to conduct lift studies and analysis with the objective to determine the requirements of a rope or sling for turnkey solutions.

All Cortland synthetic fiber lifting slings are compliant with DNV, EN or ASME listing standards and are tug-certified with appropriate product and lifting capacities.

Synthetic Fiber Solutions

Fiber vs. Steel



Over the last decade synthetic high performance ropes and slings have become a critical lifting component, replacing steel wire rope.

Modern, high strength synthetic fibers are remarkably durable and will not rust, corrode or fish-hook. They are not affected by salt or fresh water, and wear points can be protected from abrasion, cutting and heat damage. Cortland slings are less damaging to the surfaces of the products being lifted; critical in wind tower and blade material handling and installation. They are also easy to inspect and repair.

Lightweight fiber lifting slings offer significant reductions in rigging time and manpower. They are approximately 86% lighter than steel wire rope at the same strength, and offer superior flexibility which translates into fewer rigging injuries. They are also soft on hands offering a safer solution for riggers and expensive payloads. In heavy lift projects, installation operations also benefit from savings related to transportation and storage costs.

Benefits of Fiber vs. Steel:

- Lighter and easier to handle
- Minimal set-up costs
- Faster rigging and faster turnarounds
- Reduced risk of injury
- No fish hooks
- Reduced total costs
- No maintenance
- Easy to splice
- Easy to inspect

Custom synthetic sling solutions that provide higher performance and more durable service life

Testing Services

- Max tension/tension and break load 5872kN
- Full capacity testing from 24" (610 mm) to 177 ft (54 m) overall length
- 200HP pump offers full capacity cyclic RAM speed of 44 IPM
- Fully comply with all relevant legislative and internally recognized testing standards

Cortland's synthetic products have been instrumental in improving operational efficiency and safety in a diverse range of critical operations. To help customers safely manage through the lifecycle of these products, we work closely with clients to better understand long term use and retirement criteria.

Inspection and recertification services
Cortland offers inspection, proof loading, and destruction testing capabilities at our facilities in the USA, Norway, and Australia.

Services focus on destructive testing and recertification of synthetic fiber ropes and slings up to 1.3 million pounds (589t). Test equipment offers a 14 foot (4.2 m) stroke to accommodate testing of a broad range of products. In conjunction with tensile testing, we have the capability to conduct tension-tension fatigue testing up to full machine capacity thanks to high fatigue rated components.

Cortland synthetic fiber slings adhere to all key global standards; e.q. ASME B30.9 and BS EN 1492. All slings are tagged appropriately and backed by extensive process control documentation. Engineered and proof-loaded to meet precise length tolerances, Cortland slings use secure construction with efficient splice terminations. Our slings are also available with innovative integrated hardware solutions.

Plasma® torque-free braided rope construction creates strong and extremely durable lifting slings, perfect for long length lift situations

Cortland's Plasma® rope is strong enough for very heavy lifts yet durable enough for repeated use. Our exclusive Plasma® technology processes HMPE fibers into maximum strength efficiency. These fibers are then braided into a torque-free rope which is firm, yet flexible, and offers the ability to produce very long lengths. Utilizing the largest 12-strand braider in the world, Cortland can produce large diameters (up to 200 mm) and long lengths.

Unlike wire ropes and jacketed round slings, Plasma® 12 strand and 12x12 rope slings are easy to inspect. If repair is needed, the construction offers the ability to replace worn strands. Plasma rope slings are also neutrally buoyant, and do not absorb water, so there is no reduction in lifting capacity once immersed. These slings are popular in wind material handling and installation lifting systems because of their light weight and ease in handling.

Specifications:

materials:	Plasma® HMPE (other high modulus synthetic fibers available such as Aramid or LCP)
construction:	12 strand or 12x12 torque-free braid
chafe protection:	Popular braided SX chafe gear and other narrow woven options available
capacity:	Nominal diameter sizes up to 200 mm

- Eye-to-eye vertical hitch–up to 2233t MBL
- Grommet vertical hitch–up to 3685t MBL

length:	Unlimited long lengths – short lengths dependent on size
length tolerance:	As low as +/-0.25% of nominal length
certifications:	All standards including ASME 30.9 and EN1402

Cortland Rope Slings using Plasma® fiber (High Modulus PolyEthylene)

For precision wind equipment lifts

Advantages:

- SX covered eye termination size fits well on spreader bars and trunnions—less spread than round slings
- Lightweight and easy to handle
- Low D:d ratio efficiencies
- High flex fatigue and abrasion resistance
- Easily inspected and repaired
- Protective jacket offerings ranging in durability and visibility
- Custom design per application, including hardware if necessary
- Long lengths available, no upper length limits

Applications:

Surface overhead crane lifting (below the hook):

- Wind farm installation; towers, nacelles, monopiles, transition pieces (TP)
- Industrial material movement or transfer; power turbines, etc.
- Shipyards

Plasma® grommet and double grommet lifting slings have been the preferred onshore wind farm installation slings for more than 5 years

Selantic® slings offer high capacity at short lengths, with very low elongation and excellent length tolerances

High performance Selantic® slings and interfacing hardware have been supplied to the heavy lift industry since 1993. They provide a safe, reliable, cost-effective and lightweight alternative to heavy chains and wire rope.

Selantic® slings from Cortland are endless loop grommets made of a parallel laid synthetic fiber construction covered with several layers of fabrics to provide the desired sling configuration. In the interfacing areas a highly abrasive resistant HMPE/ Cordura weave is applied. Selantic® slings can be made as short as one meter and still achieve >3000t MBL; and they are torque-neutral, with no tendency to rotate under load (if rotation occurs, little strength loss is experienced). Because of their construction they have virtually no bending stiffness, providing efficient storage properties.

Selantic slings are normally specially designed for each individual application. We carefully select the optimal core material based on our experience and your application requirements. These core materials include HMPE, Aramid and LCP fibers (e.g Technora®, Dyneema®, and Spectra®). Protective jackets are also selected to ensure a durable and long-lasting lift solution. If required we can also offer engineering and delivery of specially designed hardware solutions, including thimbles, shackles, hooks and spreader bars.

Specifications:

materials:	Aramid, UHMWPE, LCP or blends
construction:	Parallel laid endless loop filaments
jacket:	Cordura® cut resistant cover, and special design wear protection in critical areas
capacity:	1 to >2000 Te MBL
length:	0.8 to 88m
length tolerance:	+/- 0.25% of nominal length and 0.1% between matched pairs
certifications:	DNV, CEN and ILO

Selantic® Slings
HMPE or Aramid Fibers

For precision onshore or offshore wind farm lifts

Advantages:

- Stiffness optimization for individual slings possible
- Ability to produce short lengths
- High strength efficiency, yet lightweight
- Possibilities for project specific bending radiuses
- Excellent length tolerances
- Protective jacket solutions, offering durability and visibility features
- Industry accepted tagging
- Easy to handle, store, and transport
- Custom design per application, including hardware if necessary

Applications:

Surface overhead crane lifting (below the hook):

- Wind farm installation; towers, nacelles, monopiles, transition pieces (TP)
- Industrial material movement or transfer; turbines, etc.
- Shipyards
- Precision lifting

Cortland Selantic® round slings have proven their value in multiple offshore wind farm installations over the last 10 years.

Chafe Protection

Chafe protection solutions to maximize the service life of lifting slings

SX Chafe Guard

Cortland Cage

Asguard

DXC Chafe

XT Chafe

PNW *available in tubular form, or hook-and-clasp*

Durability is also an important factor of overall lifting sling performance. With the addition of anti-chafe guard protection, the useful life of slings can be significantly increased, creating maximum cost efficiency with minimal maintenance. For further details on our Chafe solutions, refer to our Chafe Protection brochure.

SX Chafe Guard a braided tubular structure offering 100% protection.

Cortland Cage combines the lightweight, abrasion resistant, and non-water-absorbing properties of HMPE fiber in a braided cover sleeve.

Asgard Chafe Protection is made from HMPE and PNW fibers in a woven, laminated and PU-coated construction and built in a layered design.

DXC Chafe is a tightly braided tubular polyester chafe sleeve with proprietary polyurethane coating for use in extreme applications.

XT Chafe is a tightly braided tubular polyester chafe sleeve with proprietary heavy polyurethane coating for use in extreme chafe applications. Less flexible than other chafe options.

PNW is a woven fiber material and the most commonly used protection for abrasion; available in both tubular, and hook-and-clasp options.

Cortland combines the best alternatives and choice of slings for rigging and installation jobs:

- High tenacity Cortland Selantic® round slings
- High tenacity Cortland Plasma® braided rope slings

Cortland synthetic fiber round or braided lifting slings offer wind farm installation crews many safety and cost-saving advantages. Their performance is proven in the field and our attention to engineered detail on slings is unparalleled.

All Cortland synthetic fiber lifting slings are compliant with DNV, EN or ASME lifting standards and are tag-certified with appropriate product and lifting capacities. We also offer a variety of technical literature that provides insight into the ratings and usage guidelines for our technology.

What can we do for you?
Whatever your particular challenge, Cortland welcomes the opportunity to solve it. We have the unique experience to help any company lower costs, save time, increase safety and gain far better efficiencies. Our service doesn't end with product delivery. We also provide ongoing technical support and training for everyone involved with operating and maintaining the solution we provide.

Please email cortland@cortlandcompany.com for an initial discussion, or visit us online at cortlandcompany.com.

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Cortland is a global designer, manufacturer, and supplier of technologically advanced ropes, slings, and strength members. Collaborating with customers, our team uses its experience in high performance materials and market knowledge to transform ideas into proven products.

For more than 35 years, our custom-built solutions have been developed for work in the toughest environments and to overcome some of the world's greatest challenges. They consistently enable our customers to meet the demands of the aerospace, defense, medical, research, subsea, marine, and energy industries.

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