Plasma® Tow Slings – Vehicle Recovery Usage Guidelines
Usage Guideline

Plasma® Tow Slings – For Recovery of Equipment and Vehicles

This Usage Guideline provides information intended for the safe use of Cortland’s synthetic fiber rope tow lines. Plasma® tow lines are designed to meet the strength and durability needs of recovering stuck equipment and vehicles in mining operations.

These tow slings adhere to ASME B30.9 as well as other popular certification guidelines. To ensure the safety of all personnel using these towing slings or in the immediate area of their use, please thoroughly read the following instructions.

Note – each individual mining company may have different procedures and guidelines instituted in vehicle towing and recovery. The following information is general in nature and not designed as standards for every company – rather a guide and suggestion.
Safe Use of Plasma® Rope Tow Slings

Lightweight Plasma® tow slings are manufactured using a patented HMPE (High Modulus Polyethylene) synthetic fiber process and under ISO-9001 Quality production standards. These low elongation synthetic fiber rope slings also conform to ASME B30.9 standards.

The MBL (Minimum Break Load) values published for these synthetic tow slings are calculated using Cordage Institute 1500-02 standards and require no further reduction in published strength for eye splice terminations. Determination of the appropriate size and strength of a Cortland Plasma® Tow Sling to conduct the vehicle recovery is the responsibility of the user. Although we do recommend a rope size, MBL strength and WLL (Work Load Limit) on each sling based on vehicle weight, every recovery is different and may vary in degrees of difficulty.

These factors are not just limited to the estimated weight of the vehicle to be towed or recovered. They also include such factors as:

1. Depth of mud or dirt where stalled vehicle is situated
2. Degree of slope of incline which can increase the strength needed on the sling
3. Angles increasing force needed during recovery
4. Pulling power (force), of recovery vehicle(s)
5. Hard point, or towing connections on vehicles
6. Age and condition of towing sling

The published WLL assigned to each of the Cortland Plasma® Tow Slings is calculated at 5:1 and adheres to the ASME B30.9 sling standards. A user's decision to use these slings at WLL below 5:1 is their own responsibility and should always take into account which may decrease the MBL of the sling.

<table>
<thead>
<tr>
<th>Maximum Vehicle Weight</th>
<th>Part Number</th>
<th>Approximate Sling O.D.</th>
<th>Standard Length</th>
<th>Strength (MBL) – Vertical Eye &amp; Eye</th>
<th>Recommended Work Load Limit (WLL)</th>
<th>Total weight per towline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pounds</td>
<td>Inches</td>
<td>Feet</td>
<td>Lbs.</td>
<td>Lbs.</td>
<td>Lbs.</td>
<td>Lbs.</td>
</tr>
<tr>
<td>6,500</td>
<td>5/8&quot;</td>
<td>6.00</td>
<td>51,400</td>
<td>10,200</td>
<td>4.6</td>
<td>2.3</td>
</tr>
<tr>
<td>23,000</td>
<td>1&quot;</td>
<td>6.00</td>
<td>110,000</td>
<td>22,000</td>
<td>10.6</td>
<td>4.8</td>
</tr>
<tr>
<td>85,000</td>
<td>1 1/4&quot;</td>
<td>9.15</td>
<td>165,000</td>
<td>33,000</td>
<td>20.7</td>
<td>9.4</td>
</tr>
<tr>
<td>125,000</td>
<td>1 5/8&quot;</td>
<td>9.15</td>
<td>291,000</td>
<td>58,200</td>
<td>40.3</td>
<td>18.3</td>
</tr>
<tr>
<td>280,000</td>
<td>2 1/2&quot;</td>
<td>12.20</td>
<td>530,000</td>
<td>106,000</td>
<td>118.0</td>
<td>53.5</td>
</tr>
<tr>
<td>920,000</td>
<td>3 1/4&quot;</td>
<td>12.20</td>
<td>940,000</td>
<td>187,350</td>
<td>221.4</td>
<td>100.5</td>
</tr>
</tbody>
</table>
Before Using Plasma® Rope Tow Slings

Below are some recommended procedures to follow before using Plasma® Rope Tow Slings.

1. Before beginning the recovery operation, ensure that the area has been isolated or access restricted if necessary.

2. A Designated Competent Person (DCP) must supervise the recovery operations.

3. Items to look for before entering the area may include, but not be limited to:
   a. Live power
   b. Fuel leaks
   c. Is the equipment/vehicle secure from further movement? (e.g.)
      i. Movement of ground
      ii. Water, mud, slip, trip or fall hazards
      iii. Other equipment working in the vicinity
      iv. Potential of falling objects

4. Before starting the recovery process, make certain that there cannot be an uncontrolled movement of the equipment or vehicle. This includes provisions for stopping it, once it has been freed.

5. Make sure the area of the recovery is secured.

6. Determine the proper tow sling, (size and strength rating), required to conduct a safe recovery. Each Plasma® tow sling has MBL and WLL tagging on it. **Under no circumstances is a Plasma® tow sling to be used if the rating tag is missing or unreadable.**
   a. Follow company policies for choice of correct Plasma® tow sling for the recovery job.
   b. Also make sure that the “hard point” or “tow hitch” on the recovery vehicles securely fits the eye of the sling and can handle the strength forces imparted on it during the recovery tow. Again, check with company policies on these ratings.
   c. If connecting the Plasma® tow line to the towing “hard point” or hitch requires a shackle, please refer to the below rating chart for correct shackle sizing.

7. **The Plasma® vehicle recovery tow sling**
   a. The Plasma® tow sling, depending on the size and strength consists of the following components:
      i. The core strength of each Plasma® tow sling is a braided rope produced from Plasma®
      ii. HMPE (High Modulus PolyEthylene) synthetic fiber
      iii. The body of the sling is encased in an orange woven Cordura® nylon chafe sleeve (tube)
      iv. Eye terminations spliced or installed (formed) on each end. Eye terminations are covered with Cortland’s orange SX chafe gear; a very lightweight, cut resistant and durable covering
      v. Attached in the eye on one end of the tow sling will be a certification rating tag

Plasma® Tow Sling with 1M eye terminations each end.
Recommended Usage Procedures cont.

1. **Tow line inspection and care.** Before use of a Plasma® tow sling in this application, a qualified or designated person should always inspect the tow line, shackles and connection point of the sling to the vehicle. Cortland cannot control the use and storage of rope slings in the field. Rope, like all strength members, will deteriorate during use. Proper care and maintenance of the Cortland tow sling will ensure long and safe service life.

   **Note** - A new Plasma® tow sling consists of a braided rope strength member encased in an orange Cordura® nylon chafe protective sleeve. The cut and abrasion resistance of the Plasma® rope strength member is greater than the Cordura® chafe sleeve. Therefore, if the Cordura® sleeve is cut or damaged, careful inspection of the Plasma® rope must take place. (Please refer to Cortland's Rope Inspection Guidelines for a visual and written reference.)

   a. The following list is designed as a quick but thorough inspection checklist for Cortland Plasma® tow sling users:
      
      i. **Inspection of slings before use**
         
         1. **Eye terminations of sling.** Inspect eye terminations at each end of tow sling for distortion or cut/abrasion damage; damage or wear deemed beyond normal. Orange SX chafe gear should be intact and protecting the core rope.
         
         2. **Body of tow sling.** The orange woven Cordura® nylon is designed to protect the core Plasma® rope strength member. However, the Cordura will gradually begin to crease and cut during use. Careful inspection to make sure the possibly exposed rope core is not cut or damaged is important. The Cordura gear can be tape-repaired.
         
            a. Size and outside diameter of the tow sling should be oval-round and consistent. If there is an obvious “gap” in the body core rope – where it is possible the core rope has been severed or broken, the tow sling must not be used.

               i. The eye splice termination area from the base of the eye termination creates a larger outside diameter (O.D.) of approximately 1.5 times the rope O.D.

         3. **Tag.** A Plasma® tow sling missing its certification rating tag in one eye, or with a tag so damaged the printed information on it cannot be easily read, **must not be used.**

   b. **Inspection of connectors and connection point prior to tow**
      
      i. Inspection of connection point to tow vehicle and target vehicle to be towed
         
         1. Is the connect viable to handle forces to be placed on it?
         
         2. Is a shackle needed to the vehicle “hard point?”
            
            a. If so – a designated person must ensure that the proper shackle is used for the rating of the tow sling
            b. Shackle must have minimum strength rating stamped on it
            c. Make sure condition of shackle is good and that the shackle is not abnormally wearing against or cutting the eye of the Plasma® tow sling
Recommended Usage Procedures cont.

c. Use of the Plasma® tow sling (after sling inspection and approval)
   i. After attachment of Plasma® tow sling and before pulling forces are conducted – all personnel should be
      removed away from the towing operation. Any persons that are required to remain, must always stay
      out of the “line of fire” should a tow break or a shackle fail. If the tow sling should rupture or break,
      there is no guarantee that the sling will not rapidly recoil in a straight of wide pattern. However, typical
      rupture pattern is sequential break of the twelve strands.
   ii. Plasma® tow slings, though extremely light weight, and have similar elastic elongation properties to
       steel wire rope. Unlike polyester or nylon fiber slings, Plasma® tow slings will have less than 1%
       elongation when used at WLL. (When new, Plasma® tow slings will have approximately 4-10% elongation
       growth caused by “setting” the splice terminations and compaction on the rope construction. After the first
       loading, this construction elongation should not occur again).
   iii. Recommended to be ONLY used in straight-line loading. Angles and bends on tow line can increase the
       stress on the tow line and lower the rated WLL.
   iv. It is recommended that all twist be removed from the sling before use as this twist could reduce the
       strength of the tow sling.
   v. Never connect two or more tow slings together. This lowers the rated MBL and WLL of the tow sling,
      depending on the connection – from 15-50%.
   vi. NEVER use in a choker hitch configuration or double-back.
   vii. Use edge protectors when necessary to prevent cutting and abrasion damage to the tow sling.
   viii. After use, inspect the tow sling, shackle and connection hard point for possible damage needing repair or
       requiring retirement.

2. Storage and general care
   a. Recommended storage is in plastic container or box
      i. If on pallet, make sure other items which may damage or cut the sling are not stacked on top of the slings.
   b. Washing care
      i. Cortland Plasma® tow slings can be washed to remove dirt and grime; power washing is acceptable – allow
         to air dry before use or storage. If dirt and particulate are somehow getting beneath the chafe sleeves and
         into the core Plasma® rope, some internal abrasion may be happening. Inspection procedures for Plasma®
         rope can be reviewed at our website at cortlandcompany.com
   c. Environmental
      i. UV and sunlight resistance on Plasma® tow slings is excellent and should not erode the strength of the core
         rope in the sling over its service life.
      ii. Water does not affect the strength of Plasma® tow slings. However liquids which contain high Ph or acidic
          values can degrade the strength of the sling. (For additional chemical information please consult our
          website at cortlandcompany.com
   d. Plasma® tow sling service life
      i. Plasma® HMPE tow slings, if worked at or below recommended WLL and inspected for possible cutting
         or severe abrasion damage, should provide very long and safe service life. The HMPE synthetic fiber
         has far superior tension-tension loading fatigue performance to steel wire rope and other synthetic fibers.
         Therefore, the continued loading and unloading at our below WLL should not be cause for sling retirement.
      ii. The chafe covers on the sling eyes and body should deteriorate and wear faster than the covered
          strength-member Plasma® rope. However, the wear of the chafe gear can be extended through care
          of use against sharp edges and through tape-repair.
      iii. Plasma® tow slings can be repaired at factory or factory-authorized distribution centers. Repair requires
          inspection of rope and fiber integrity, possible re-splice terminations and addition of new chafe gear. A
          program of repair can be set up if needed between Cortland and the end-user.
### Recommended Usage Procedures cont.

#### Plasma® Tow Sling Retirement Checklist

<table>
<thead>
<tr>
<th>Inspection Evidence</th>
<th>Safe to Use</th>
<th>Repair</th>
<th>Retire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tagging</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing or illegible</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>Eye splice termination</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eye shape close to original, possible distorted slightly by shackle or hard point</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length increase (possibly due to splice slippage or “pull-out”)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cut through yellow SX chafe gear</td>
<td>If rope not cut and gear can be tape-repaired</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If rope inside SX gear is cut</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Body of sling</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaps or uneven shape in body (taking into account larger areas below splice)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cut through orange Cordura chafe gear</td>
<td>If rope not cut and gear can be tape-repaired</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If rope inside orange gear is cut</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color and condition change of chafe sleeves</td>
<td>If color change is simple lightening due to UV</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal wear and tear – chafe gear is fuzzy, possibly creased, slightly cut</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grease and solvents – which is eroding chafe gear and possibly interior rope core</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mud and dirt</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

For additional information on the use, care and maintenance, please refer to the Cortland website cortlandcompany.com or call +1 (360) 293-8488.
Cortland is driven by innovative thinking, use of high technology materials and attention to detail. Our in-depth understanding of demanding operational environments means we can deliver trusted, proven solutions to our customers worldwide.

Today, Cortland provides innovative, efficient and lightweight rope, slings, cables and umbilicals to the oil and gas, heavy marine, subsea, ROV, seismic, defense, aerostat and medical markets. Cortland is a part of Actuant Corporation (NYSE: ATU), a diversified industrial company with operations in more than 30 countries.

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