



**Puget Sound
ROPE**

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Puget Sound Rope's 12 x 12 Construction is designed specifically for high modulus, high strength fibers such as Spectra® and Plasma® enhanced Spectra®. This patented construction addresses the most critical properties of the fibers to provide a stronger, more durable rope that is easy to inspect and can be quickly spliced using standard 12 strand splices.

The construction consists of lightly twisted strands of fiber that have been braided into a 12 strand primary rope with a looser-than-normal braid pattern. Twelve of these primary ropes are then urethane coated and braided into the final rope. By having 12 individual ropes serve as the primary rope strands, it is now possible to repair a damaged rope by simply removing the section of damaged strand and splicing in a replacement.

By reducing the size of the primary yarn bundles and laying them in a pattern more in line with the longitudinal axis of the rope, the radial compression loads are reduced and the rope achieves a higher translational efficiency. As a result of smaller strands with a lower twist angle, the fibers all share the load more evenly, thereby reducing the peak load on any individual fiber. This load sharing greatly reduces long term damage due to creep and tension fatigue.



All of the modern high strength, high modulus fibers achieve their incredible strengths through a fiber morphology consisting of long chain molecules that are predominantly aligned with the axis of the fiber. As a result of this highly refined structure, all fibers of this type, to varying degrees, are susceptible to axial compression fatigue failure. The HPME fibers such as Spectra are far less susceptible to this type of failure than more rigid fibers such as Kevlar or Technora, but it is nonetheless one of the principle long term failure mechanisms of all high performance ropes. Degradation of the fiber occurs whenever excessive axial compression loads break down individual microfibrils within the fiber. Like degradation from ultraviolet light, chemicals or long term heat exposure, this damage is accumulative and cannot be detected during a visual inspection of the rope.

By far, the most important aspect of the 12 x 12 Rope Construction is the manner in which it handles compression loads when wrapped around a pulley, roller, winch drum, staple or chock. The complex multibraid construction arranges the fibers in a manner wherein the fibers at the root of a pulley (or any other curved surface) are predominately at an angle to the axis of the rope, thereby greatly reducing the chance of being subjected to damaging axial compressive loads. At the same time, the fibers at the outer perimeter of the rope are also at an angle to the axis of the rope allowing the rope to flatten on the

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pulley, thereby reducing the tension loads on the outer fibers. The overall result is that this rope construction incurs significantly less damage when cycled over pulleys, winch drums or other rounded objects and hence will have a longer service life.

All of these superior properties are accomplished while greatly improving the handling characteristics of the rope. The rope does not depend on an extra jacket or heavy urethane coating for its coherence, therefore it has a soft hand and can be easily inspected for damage. With jacketed ropes the weakest component is the jacket itself. Once the jacket is compromised, the rope must be retired. The 12 x 12 rope has proven to be more durable and easily repaired.

The 12 x 12 Rope Construction has been on the market for eight years and has a proven track record in some of the most severe applications: tractor tug hawsers, mooring lines, anchor pendants and tow lines.

If you have any question concerning the 12 x 12 Rope Construction, please feel free to contact us at any time.

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