

Rope Fiber Selection Guide: Fiber Properties and Typical Values

STRENGTH:	Manila	Sisal	Cotton	Nylon	Polyester	Polypropylene	Polyethylene	Kevlar 1*	Spectra 2*
Breaking Tenacity– (grams/denier)	5.0-6.0	4.0-5.0	2.0-3.0	7.0-9.5	7.0-9.5	6.5	6.0	18-26.5	30.0
Wet Strength vs. Dry Strength	Up to 120%	Up to 120%	Up to 120%	85-90%	100%	100%	100%	95%	100%
Shock-load Absorption Ability	Poor	Poor	Very Poor	Excellent	Good	Very Good	Fair	Poor	Fair
WEIGHT:									
Specific Gravity	1.38	1.38	1.54	1.14	1.38	0.91	0.95	1.44	0.97
Floats	No	No	No	No	No	Yes	Yes	No	Yes
ELONGATION:									
Percent at Break	10-12%	10-12%	5-12%	18-25%	12-15%	15-25%	15-25%	1.5-3.6%	3.5%
Creep (extension under sustained load)	Very Low	Very Low	Very Low	Moderate	Low	High	High	Very Low	Moderate
EFFECTS OF MOISTURE:									
Water Absorp. of Individual Fibers	Up to 100%	Up to 100%	Up to 100%	2-8%	< 1%	None	None	3.5-7.0%	None
Dielectric Properties	Very Poor	Very Poor	Very Poor	Poor	Good	Excellent	Excellent	Poor	Excellent
DEGRADATION:									
Resistance to UV in Sunlight	Good	Good	Good	Good	Excellent	Poor (black is best)	Fair (black is best)	Fair	Fair
Resistance to Rot and Mildew	Poor	Poor	Poor	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Storage Requirements	Dry only	Dry only	Dry only	Wet or Dry	Wet or Dry	Wet or Dry	Wet or Dry	Wet or Dry	Wet or Dry
ROPE ABRASION RESISTANCE:									
Surface	Good	Fair	Poor	Very Good	Excellent	Good	Good	Fair	Very Good
Internal	Fair	Fair	Fair	Excellent	Excellent	Good	Good	Poor	Excellent

THERMAL PROPERTIES:									
Melts at	Does not melt, Chars at 350°	Does not melt, Chars at 350°	Does not melt, Chars at 350°	420-480°	490-500°	330°	275°	800° - Begins to decompose	297°

RESISTANCE 3*:									
Resistance to Acids	Poor	Poor	Poor	Fair	Good	Excellent	Excellent	Fair	Excellent
Resistance to Alkalis	Poor	Poor	Fair	Very Good	Fair	Excellent	Excellent	Fair	Excellent
Resistance to Oils and Gas	Poor	Fair	Poor	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good

1* Based on DuPont Kevlar® data

2* Based on Allied-Signal Spectra® data-Type 900

3* Resistance is relative to the length of exposure, percent of concentration and temperature.

CAUTION:

Use of Working Loads

Because of the wide range of rope use, rope condition, and exposure to the various factors affecting the rope, it is impossible to make blanket recommendations as to the correct choice of rope to use. However, we have provided the tensile strength for each diameter and type of rope. These strengths are based on tests of new and unused rope, with appropriate splices. Proper choice, care and inspection of the rope are essential for reasonably safe use of the rope. Consult your cordage vendor for proper use.

Dynamic Loading Voids Normal Works Loads

Dynamic Loading occurs when rope is subjected to sudden or extreme stress. Figures given as working loads are void if rope has been subjected to dynamic loading, high temperatures, long periods of load, extreme stress, improper use or storage.

Effect of Temperature on Tensile Strength

The tensile strength charts apply to ropes tested at normal room temperature (70°F). Ropes have lower tensile strength at higher temperatures. Continued exposure at elevated temperatures causes permanent damage.

WARNING! MISUSE OF ROPES COULD RESULT IN SERIOUS INJURY.