Fibre Qualities

Comparative Characteristics

Fibre	Tenacity of dry fibre (gm/denier)	Wet strength compared to dry strength	Rope shock load absorption	Specific Gravity	Able to float	Strength/ Weight ratio (av.)	Elongation & Creep
Sisal	4-5	Up to 120%	Poor	1.5	No		Fibre elongation: Dry 2.9%, Wet 3.4%. Rope elongation: Dry 13%, Wet 16%. Extension causes rupture.
Manila	5-6	Up to 120%	Poor	1.5	No		Fibre elongation: Dry 2.8%, Wet 3.2%. Rope elongation: Dry 13%, Wet 15%. Extension causes rupture.
Polyethylene	6	100%	Good	0.95	Yes	2.10	High tenacity. Good recovery after stretch and extension at break of 50%. High creep.
Polypropylene	6.5	100%	Very Good	0.91	Yes	2.50	High tenacity. Good recovery from stretch and elongation at break for ropes is 25-30%. High creep.
HT Polyester	7-10	100%	Very Good	1.38	No	2.25	Elongation 35% at break. Low creep.
Nylon	9	85-90%	Excellent	1.14	No	3.00	Elongation Dry 40%. Wet 35%. Moderate creep.
Aramid (Kevlar®)	18-26	95%	Fair	1.44	No		Elongation 4% at break. Very low creep.
Technora®	28	100%		1.39	No		Elongation 4.5% at break. Low creep.
UHMwPE	28	100%		0.97	Yes		Elongation 2-5% at break.

Chemical Resistance & Degradation

Fibre	Effects of acids	Effects of Alkalis	Effect of Organic Solvents	UV resistance in sunlight	Other	Resistance to aging*
Sisal	Degradation of acids in high concentration or temperature.	Resistant	Resistant	Good	Degradation by sea water, paints, detergents, chemical salts and fats	Good
Manila	Degradation of acids in high concentration or temperature.	Degradation by alkalis.	Resistant	Good	Degradation by paints, detergents, chemical salts and fats	Good
Polyethylene	Very resistant	Very resistant	Soluble in hot chlorinated hydrocarbons.	Good (UV stabilised)		Excellent
Polypropylene	Very resistant	Very resistant	Soluble in chlorinated hydrocarbons.	Good (UV stabilised)		Excellent
HT Polyester	Resistant to most mineral acids. Disintegrated by 95% sulphuric acid.	No effect cold. Slowly disintegrated by strong alkalis at the boil.	Generally unaffected. Soluble in some phenolic compounds.	Excellent		Excellent
Nylon	Decomposed by strong mineral acids. Resistant to weak acids.	Little or none	Resistant, soluble in some phenolic compounds and in 90% formic acid.	Good		Excellent
Aramid (Kevlar®)	Resistant to weak acids. Degradation by strong acids & bases in high concentrations or temperatures.		Resistant	Fair	Degrades in Chlorine bleach.	Excellent

Fibre	Effects of acids	Effects of Alkalis	Effect of Organic Solvents	UV resistance in sunlight	Other	Resistance to aging*
Technora®	Resistant to mineral and organic acids. Degrades in hydrochloric, hydrobromic and sulphuric acids.	Resistant	Resistant		Resistant to sea water and steam. Sensitive to bleaching and sunlight.	Excellent
UHMwPE	Chemically inert except for strong oxidising acids.	Resistant	Resistant to cold alcohols, ethers, esters, ketones & bleaches.	High		Excellent

* for properly stored rope

Rope Abrasion Resistance & Heat Reaction

Fibre	Surface abrasion	Internal abrasion	Heat reaction
Sisal	Fair	Good	Burns as fire touches flame. Supports combustion.
Manila	Good	Good	Critical temp is 150°C after which fibre burns at flame. Supports combustion.
Polyethylene	Fair	Good	Softens 100°C. Melts 110°C - 120°C.
Polypropylene	Good	Good	Shrinks rapidly from flame. Curls and melts at 165°C.
HT Polyester	Excellent	Excellent	Softens 228°C. Melts 255°C.
Nylon	Very Good	Excellent	Softens 229°C. Melts 249°C - 260°C.
Aramid (Kevlar®)	Fair	Good	371°C decomposition
Technora®	Very Good	Very Good	500°C+ decomposition
UHMwPE	Excellent	Excellent	Melts 152°C.