Technical Bulletin

Fiber Data

FIBER STRENGTH RETENTION AFTER CHEMICAL IMMERSION

(Dyneema® strength retention after 6-months immersion)

AGENT	HMPE
Sea Water	100%
Hydraulic Fluid	100%
Kerosene	100%
Gasoline	100%
Glacial Acetic Acid	100%
1 M Hydrochloric Acid	100%
5 M Sodium Hydroxide	100%
Ammonium Hydroxide (29%)	100%
Hypophosphite Solution (5%)	100%
Perchloroethylene	100%
10% Detergent Solution	100%
Bleach	91%

COMPARISON OF FIBER CHARACTERISTICS

(using nylon as a basis of 1.0)

GENERIC FIBER TYPE	NYLON	POLYESTER	POLYPROPYLENE	HMPE	LCP	ARAMID	PBO
Tenacity (g/den)[1]	7.5 – 10.5	7 – 10	6.5	32 (SK-60) 40 (SK-75)	23 – 26	28	42
Elongation[2]	15 – 28%	12 – 18%	18 – 22%	3.6%	3.3%	4.6%	2.5%
Coefficient of Friction[3]	.12 – .15	.12 – .15	.15 – .22	.05 – .07	.12 – .15	.12 – .15	.18
Melting Point	425°– 490° F	480°– 500° F	330° F	300° F	625° F	930° F*	1200° F*
Critical Temperature[4]	325° F	350° F	250° F	150° F	300° F	520° F	750° F
Specific Gravity	1.14	1.38	.91	.98	1.40	1.39	1.56
Cold-Flow (Creep)[5] In Mooring Line Use	Negligible	Negligible	Negligible to high	Negligible to high	Negligible	Negligible	Negligible

** Char temperature — does not melt*

[1] **TENACITY** is the measurement of the resistance of fiber to breaking.

[2] **ELONGATION** refers to percent elongation of fiber at break.

[3] **COEFFICIENT OF FRICTION** is based on reluctance to slip or slide.

[4] **CRITICAL TEMPERATURE** is defined as the point at which degradation is caused by temperature alone.

[5] **COLD FLOW (CREEP)** is defined as fiber deformation (elongation) due to molecular slippage under a constant static loading situation. Fibers that have this inherent characteristic will display extremely low or negligible creep if minor fluctuations occur in the rate and/or frequency of load levels. In rope form, this would apply to polypropylene, polyethylene and HMPE fibers such as Spectra® and Dyneema® fiber.

ROPE CONSTRUCTION

3-Strand

8-Strand

12-Strand

Double Braid

8x3-Strand

Round Plait

Core Dependent

Both Class I and Class II ropes can be produced in various rope constructions such as: 3-strand, 8-strand, 8x3-strand, 12-strand, double braids, or core-dependent braids.

All Samson ropes are categorized for splicing and testing purposes as a Class I or Class II construction.

Class I ropes are produced with non high modulus fibers that impart the strength and stretch characteristics to the rope which have tenacities of 15 grams/denier (gpd) or less and a total stretch at break of 6% or greater.

Class I ropes are produced with traditional fibers such as: olefin (polypropylene or polyethylene), nylon, and polyester.

Class II ropes are produced with high modulus fibers that impart the strength and stretch characteristics to the rope which have tenacities greater than 15 grams/denier (gpd) and a total stretch at break of less than 6%. Typical Class II ropes are produced with: HMPE (Dyneema® or Spectra®), Aramid (Technora® or Kevlar®), LCP (Vectran®), PBO (Zylon®), and carbon fibers.