KEVLAR® PARA-ARAMID

WHY KEVLAR® PARA-ARAMID?

Key Features

- High strength to weight ratio
- Low elongation to break
- Good heat & flame resistance
- Good chemical resistance
- High cut resistance
- Excellent ballistic properties

Disadvantages

- Kevlar® suffers from UV degradation, which causes strength loss and discoloration
- Propensity to absorb moisture, up to 5% moisture regain
- Poor compressive force properties

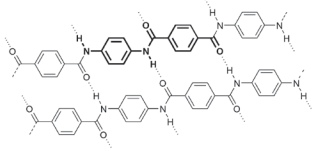
FIBER-LINE® PROCESS FOR KEVLAR®

- Coating
- Twisting
- Extrusion
- Pultrusion
- Precision Winding

FIBER-LINE® KEVLAR® PRODUCTS

- Ripcords
- Strength Members
- Industrial Fabric Yarn
- Swellcoat® Binder Yarn in between strength members and industrial fabric yarn
- Belt & Hose Reinforcement Yarn
- Packing Yarn
- Wire Harness Yarn
- Synthetic Wire Rope
- Kevlar® Distribution Program

Molecular Structure



Chemical Name

Poly-para-phenylene terephthalamide.

Manufacturer

DuPont™.

History

Kevlar® was first developed by chemist Stephanie Kwolek at DuPont™ in the 1930's. It was first commercially used in the 1970's as a replacement for steel in racing tires.

Composition

Kevlar® is an aromatic polyamide that is characterized by long rigid crystalline polymer chains. "Para" refers to the specific linkage position of the aromatic rings. Longitudinal alignment of the hydrogen bonds enables high tensile strength and modulus.

Common Deniers

200, 380, 400, 750, 800, 1000, 1420, 2160, 2250, 2840, 3000, 7100.

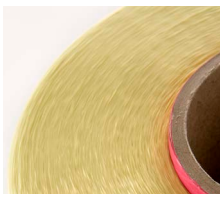
Types

T-29 : Standard Modulus.

T-49 : High Modulus.

AP : 15% higher tenacity than T-29.

KM2 : Optimized ballistic resistance for armor applications.



KEVLAR® PARA-ARAMID (HM) BARE FIBER PERFORMANCE

Abrasion Resistance	Yarn on Yarn Abrasion	Ultraviolet (UV) Resistance	Flame Resistance	Chemical Resistance (Acid)	Chemical Resistance (Alkali)	Chemical Resistance (Organic Solvent)
✓	O	X	✓	✓	✓	✓

CHEMICAL COMPATIBILITY

Chemical Resistance to Acid: *Degrades in Formic, Hydrochloric, and Sodium Hydroxide acid.*

Chemical Resistance to Alkali: *Strong alkalis will attack at high temperature or concentration.*

Chemical Resistance to Organic Solvent: *Degrades moderately in Carbon Tetrachloride and Ethylene Glycol/Water.*

KEVLAR® PARA-ARAMID DATA

Standard Modulus

Property	UOM	Value
Breaking Tenacity	g/d	23.0
Specific Gravity	Ratio	1.44
Elongation @ Break	%	3.5
Tensile Modulus	g/d	555
Moisture Regain*	%	5.0
Creep**	%	<0.03
Shrinkage***	%	<0.02
Melt Point	°C	None
Decomposition Temp.	°C	425-480

High Modulus

Property	UOM	Value
Breaking Tenacity	g/d	23.6
Specific Gravity	Ratio	1.44
Elongation @ Break	%	2.5
Tensile Modulus	g/d	885
Moisture Regain*	%	5.0
Creep**	%	<0.03
Shrinkage***	%	<0.02
Melt Point	°C	None
Decomposition Temp.	°C	425-480

** Equilibrium moisture regain @ 55% RH ** Creep @ 40%-58% ultimate tensile strength *** Shrinkage in dry air @ 177 C for 30 minutes*

ABOUT FIBER-LINE®

For over 25 years, FIBER-LINE® has provided science-driven expertise that improves the performance and the end-use processing of high performance fibers. Our products enable the search for new energy reserves and extend the life of fiber optic telecommunication cables. They also add important characteristics, such as SWELLCOAT® water-blocking, water repellence, adhesion, color, and wear and UV-resistance to these and many other applications. We believe that our ongoing commitment to protect the environment, to remain at the forefront of fiber and coating technology, and to 'treat others as we want to be treated' will continue to drive the success of our customers, shareholders, and employees.

DUPONT™ PARTNERSHIP

- FIBER-LINE® values its relationships with both its customers and suppliers. Over the last several years, FIBER-LINE® and DuPont™ have formed a strong partnership based upon the synergies between both organizations.
- FIBER-LINE®'s ability to add value to the already attractive properties of both Kevlar®Para-Aramid & Nomex® Meta-Aramid creates more opportunity in the market place to provide solution driven products to a diverse range of markets.
- Because FIBER-LINE® already processes so many different types and deniers of both Kevlar® & Nomex®, we have been authorized by DuPont™ to distribute small quantities of these fibers to an ever-growing customer base.
- Through this program, we hope to introduce businesses of all sizes to the benefit of Aramid fibers. Contact us today for small order quantity orders.

LOCATIONS

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