

TYPICAL AND COMPARATIVE PROPERTIES OF KEVLAR®

Table II-1 lists the typical yarn, tensile and thermal properties of KEVLAR 29 and KEVLAR 49 yarns.

Additional products in the KEVLAR family of fibers are available with different combinations of properties to meet your engineering design needs.

Please contact your Du Pont Representative or call 1-800-4-KEVLAR to discuss your specific application and determine the optimum KEVLAR fiber for you.

TABLE II-1. Typical Properties of Du Pont KEVLAR® 29 and 49 yarns

Property	Unit	KEVLAR 29	KEVLAR 49
YARN			
Type	denier (dtex) # of filaments*	1,500 (1,670) 1,000	1,140 (1,270) 768
Density	lb/in. ³ (g/cm ³)	0.052 (1.44)	0.052 (1.44)
Moisture Levels			
As Shipped**	%	7.0	3.5
Equilibrium from Bone-Dry Yarn***	%	4.5	3.5
TENSILE PROPERTIES			
Straight Test on Conditioned Yarns†			
Breaking Strength	lb (N)	76.0 (338)	59.3 (264)
Breaking Tenacity	g/d (cN/tex) psi (MPa)	23.0 (203) 424,000 (2,920)	23.6 (208) 435,000 (3,000)
Tensile Modulus	g/d (cN/tex) psi (MPa)	555 (4,900) 10.2 x 10 ⁶ (70,500)	885 (7,810) 16.3 x 10 ⁶ (112,400)
Elongation at Break	%	3.6	2.4
Resin Impregnated Strands††			
Tensile Strength	psi (MPa)	525,000 (3,600)	525,000 (3,600)
Tensile Modulus	psi (MPa)	12.0 x 10 ⁶ (83,000)	18.0 x 10 ⁶ (124,000)
Property	Unit	KEVLAR 29	KEVLAR 49
THERMAL PROPERTIES			
Shrinkage			
In Water at 212°F (100°C)	%	<0.1	<0.1
In Dry Air at 351°F (177°C)	%	<0.1	<0.1
Shrinkage Tension			
In Dry Air at 351°F (177°C)	G/D (cN/tex)	<0.1 (0.88)	<0.2 (1.77)
Specific Heat			
At 77°F (25°C)	cal/g x °C (J/kg x K)	0.34 (1,420)	0.34 (1,420)
At 212°F (100°C)	cal/g x °C (J/kg x K)	0.48 (2,010)	0.48 (2,010)
At 356°F (180°C)	cal/g x °C (J/kg x K)	0.60 (2,515)	0.60 (2,515)
Thermal Conductivity,			
	BTU x in./h x ft ² x °F [W/(m x K)]	0.3 [0.04]	0.3 [0.04]
Decomposition Temperature in Air***			
	°F (°C)	800-900 (427-482)	800-900 (427-482)
Recommended max. Temperature Range for Long-Term Use in Air			
	°F (°C)	300-350 (149-177)	300-350 (149-177)
Heat of Combustion			
	BTU/lb (Joule/kg)	15,000 (35 x 10 ⁶)	15,000 (35 x 10 ⁶)
Poisson's Ratio			
			0.36

NOTE: The data in this table are those most commonly observed and are representative of the particular denier and type indicated; they are not product specifications. Properties will vary with denier and type. For KEVLAR 29, the basis weight used to calculate denier is zero finish and 4.5% moisture. For KEVLAR 49, the basis weight used to calculate denier is zero finish and 0% moisture. *Filament diameter is 0.00047 inches (12 microns).

**Typical moisture levels on yarn as shipped; they reflect values reached at normal, moderate temperature and humidity levels following fiber production, which is a wet process.

***Equilibrium values are determined by bone drying the fiber and conditioning at 75°F (24°C), 55% RH.

†ASTM D885-85, tested at 1:1 twist multiplier.

††Epoxy-impregnated strands, ASTM D2343

‡Varies with rate of heating.