

Carbon Fiber

Features:

Extremely high stiffness

High tensile strength

Excellent corrosion resistance

Excellent fatigue properties

Excellent compression properties

Low coefficient of linear expansion:
-1.1 x 10⁻⁶ cm/cm°C (.0.6 x 10⁻⁶ in/in°F)

Benefits:

With a variety of modulus available from standard 33 msi to ultra high modulus pitch over 125 msi carbon fiber has the highest specific modulus of all the commercial reinforcing fibers.

The strongest of all commercial reinforcing fibers in tension. Especially good for the tension skin on cored composite laminates

Used in reinforcing concrete, carbon has good alkaline resistance as well as resistance to salt water and many other chemical environments.

Used as a primary reinforcement for fatigue prone products such as helicopter and wind turbine blades as well as off shore power and sailboats.

Proper fiber sizing for the resin matrix selected can yield impressive compressive properties but this quality can be quite difficult to measure with standard ASTM test methods and careful test specimen preparation is critical to achieve accurate results.

Carbon is a good tooling reinforcement for molds that will see temperature and where parts need tight dimensional stability.

Cautions with Carbon Fiber:

Carbon is electrically conductive so isolation (usually with glass cloth) is critical when mounting electrical components. Metallic parts may corrode in salt water environments if improperly isolated.

Carbon fiber dust (while grinding etc.) may short out electrical tools.

Carbon fiber is not as good on sharp impacts as Glass (especially S-Glass) or Aramid fibers but properly engineered laminates (especially cored laminates) can utilize carbon very well for “global impact” loads such as slamming in power and off shore sail boats.



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TORAYCA - TYPICAL FIBER PROPERTIES								
FIBER TYPE	Filaments per tow	Tensile Strength		Tensil Modulus		Elongation	Yiel g/1000m	Density g/cm ³
		ksi	Mpa	Msi	Gpa			
T300	1K	512	3,560	33.4	230	1.5%	66	1.76
	3K						198	
	6K						396	
	12K						800	
T400H	3K	640	4,410	36.3	250	1.8%	198	1.80
	6K						396	
T700S	12K	711	4,900	33.4	230	2.1%	800	1.80
	24K						1650	
T800S	24K	853	5,880	42.7	294	2.0%	1030	1.80
T1000G	12K	924	6,370	42.7	294	2.2%	485	1.80
M35J	6K	683	4,700	49.8	343	1.4%	225	1.75
	12K						450	
M40J	3K	640	4,410	54.7	377	1.2%	113	1.77
	6K						225	
	12K						450	
M46J	6K	611	4,210	63.3	436	1.0%	223	1.84
	12K						445	
M50J	3K	597	4,120	69	475	0.8%	109	1.88
	6K						218	
M55J	6K	583	4,020	78.2	540	0.8%	218	1.91
M60J	3K	569	3,920	85.3	588	0.7%	103	1.93
	6K						206	
M30S	18K	796	5,490	42.7	294	1.9%	760	1.73
M40	1K	398	2,740	56.9	392	0.7%	61	1.81
	3K						182	
	6K						364	
	12K						728	

Data compliments Toray Carbon Fibers

ZOLTEK - TYPICAL FIBER PROPERTIES								
FIBER TYPE	Filaments per tow	Tensile Strength		Tensil Modulus		Elongation	Yiel g/1000m	Density g/cm ³
		ksi	Mpa	Msi	Gpa			
PANEX 35	50K	550	3,791	35	241	1.5%	2,900	1.81

Data compliments Zoltek

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