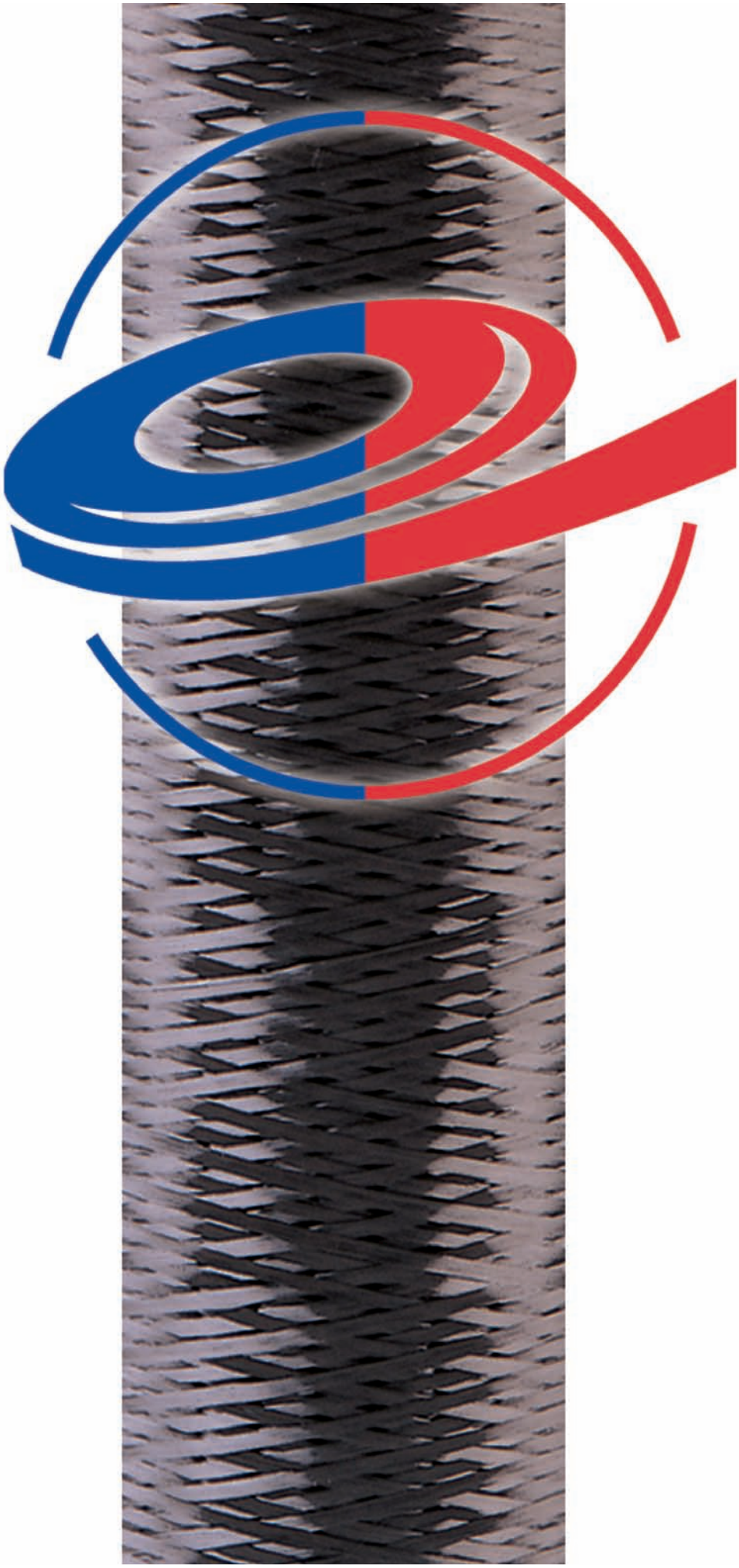
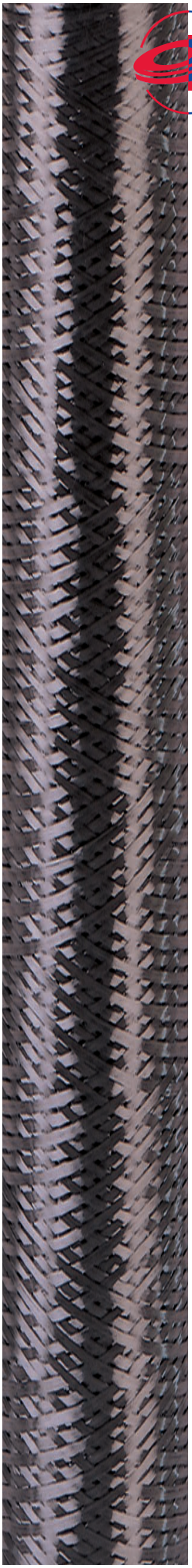


HexTow® Carbon Fiber

from Hexcel

HEXCEL®



HexTow® Carbon Fiber *Selector Guide*

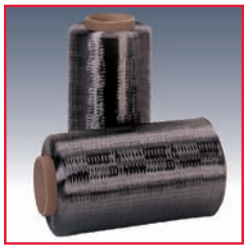
HexTow® carbon fiber from Hexcel is produced in a continuous operation in which the polyacrylonitrile precursor undergoes a series of precisely controlled processes. Exposure to extremely high temperatures chemically changes the precursor, yielding high strength-to-weight and high stiffness-to-weight properties through oxidation, carbonization and graphitization. The successive surface treatment and sizing stages improve bonding and handleability. The resulting carbon fiber is stronger than steel, lighter than aluminum and as stiff as titanium. It can be supplied in two basic forms: Continuous Fiber and Chopped Fiber.

HEXCEL STRENGTHS

- Vast aerospace database
  - Extensive military, space and commercial aerospace qualifications
- More than 30 years of carbon fiber manufacturing experience
  - U.S. precursor
- Technology development capability
- Customer technical support

CONTINUOUS FIBER

Continuous fiber can be combined with virtually all the thermoset and thermoplastic resin systems. They are used for weaving, braiding, filament winding applications, uni-directional tapes and prepreg tow for fiber placement.

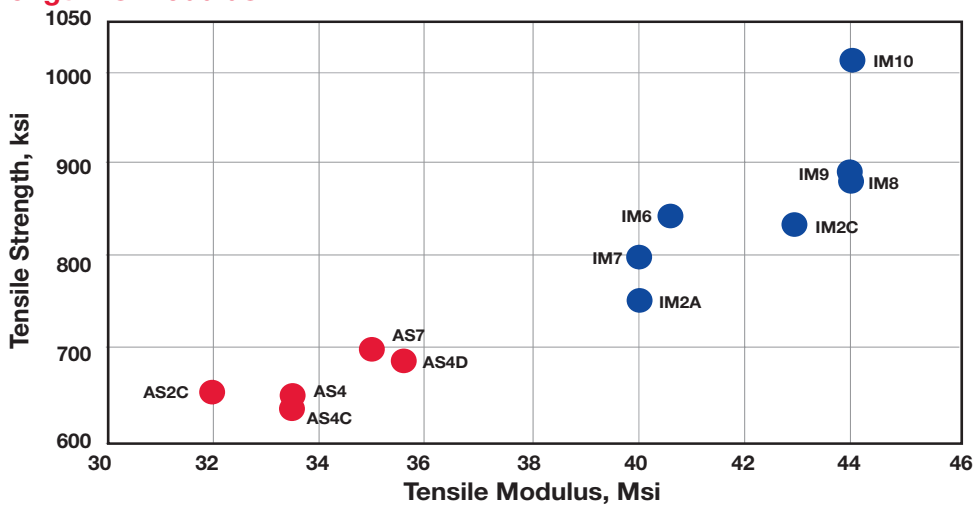


Typical Product Data

Fiber Type	Number of Filaments	Tensile Strength		Tensile Modulus*		Strain**	Weight/Length	Density	Standard Spool Size
		ksi	MPa	Msi	GPa	%	(g/m)	(g/cm³)	(lb)
AS2C	3,000	644	4,440	32.0	221	1.9	0.200	1.80	4.0
AS4	3,000	653	4,500	33.5	231	1.8	0.210	1.79	4.0
	6,000	628	4,330	33.5	231	1.8	0.427	1.79	4.0
	12,000	649	4,475	33.5	231	1.8	0.858	1.79	8.0
AS4C	3,000	647	4,460	33.5	231	1.8	0.200	1.78	4.0
	6,000	626	4,320	33.5	231	1.8	0.400	1.78	4.0
	12,000	634	4,370	33.5	231	1.8	0.800	1.78	8.0
AS4D	12,000	689	4,750	35.5	245	1.8	0.765	1.79	8.0
AS7	12,000	700	4,830	35.0	241	1.8	0.800	1.79	8.0
IM2A	6,000	740	5,100	40.0	276	1.7	0.223	1.78	2.0
	12,000	790	5,450	40.0	276	1.8	0.446	1.78	4.0
IM2C	12,000	830	5,720	43.0	296	1.9	0.446	1.78	4.0
IM6	12,000	833	5,740	40.5	279	1.9	0.446	1.76	4.0
IM7	6,000	770	5,310	40.0	276	1.8	0.223	1.78	2.0
	12,000	822	5,670	40.0	276	1.9	0.446	1.78	4.0
IM8	12,000	885	6,102	44.0	305	1.8	0.446	1.78	4.0
IM9	12,000	890	6,140	44.0	304	1.9	0.335	1.80	2.0
IM10	12,000	1,010	6,964	44.0	303	2.1	0.324	1.79	2.0

* Tensile Modulus Calculated as Secant (6000 - 1000)
** Strain at Failure

Strength vs Modulus



Typical Epoxy Composite Properties*

Property	IM10 12k		IM7 12k		AS4 12k	
	US Units	SI Units	US Units	SI Units	US Units	SI Units
0˚ Tensile Strength	480 ksi	3310 MPa	395 ksi	2723 MPa	320 ksi	2205 MPa
0˚ Tensile Modulus	27.5 Msi	190 GPa	23.8 Msi	164 GPa	20.5 Msi	141 GPa
0˚ Tensile Strain	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%
0˚ Short Beam Shear Strength	18.5 ksi	128 MPa	18.5 ksi	128 MPa	18.5 ksi	128 MPa
0˚ Compressive Strength	260 ksi	1793 MPa	260 ksi	1793 MPa	222 ksi	1530 MPa
0˚ Compressive Modulus	23.8 Msi	164 GPa	21.7 Msi	150 GPa	18.6 Msi	128 GPa

*Typical HexPly® 8552 Composite Properties (Room Temperature, Dry Test Results). All data shown are normalized to 60% Fiber Volume.

Sizing Available with HexTow® Continuous Carbon Fiber Products

Designation	Fiber Out-Life	Size Compatibility**	Recommended Uses	Sizing Level
Unsized	Indefinite	Epoxy, Phenolic, Polycarbonate, Polyurethane, Polyester, Polysulfones, Cyanate Ester, Vinyl Ester, Nylon, BMI, PES, PEEK, PEKK, PES, PVC, Polyimide, Polypropylene	Prepreg Tape	0
G	12 months	Epoxy, Phenolic, Polycarbonate, Polyurethane, Polysulfones	Weaving Prepreg Tape	0.8 - 1.2 0.2 - 0.4
GP	Indefinite	Epoxy, Phenolic, Vinyl Ester, Polyurethane, Cyanate Ester	Weaving & Filament Winding Prepreg Tape	0.8 -1.2 0.2 - 0.4
H	Indefinite	Epoxy	Weaving	0.8 - 1.2
R	Indefinite	Epoxy, Polyester	Filament Winding	1.2 - 1.6
GS	36 months	Epoxy, Vinyl Ester, Polyurethane	Prepreg Tape	0.3 - 0.7
E	Indefinite	Epoxy, Polyester	Prepreg Tape, Weaving, Pultrusion & Filament Winding	0.9 -1.3
J	Indefinite	Epoxy	Weaving	0.8 - 1.2

** Compatibility with these Matrices are considered theoretically compatible. Hexcel cannot guarantee their results.

CHOPPED FIBER

Chopped fiber is used in compression and injection molding compounds to produce machine parts, gears and chemical valves. The finished products have excellent corrosion, creep and fatigue resistance, plus high strength and stiffness characteristics.

HexTow® Chopped Carbon Fiber Products

		Chopped Carbon Fiber Type			
Property	**Units**	**1**	**2**	**3**	**4**
IM Carbon Fiber	%	100	50 -100	0 - 100	0
AS Carbon Fiber	%	0	0 - 50	100 - 0	100
Fiber Length*	in.	0.25	0.25	0.25	0.25
	mm	6.4	6.4	6.4	6.4
Standard Packaging	lbs	40	40	40	40
	kg	18.1	18.1	18.1	18.1

* Other fiber lengths available on request.

Sizing Available with HexTow® Chopped Carbon Fiber Product

Sizing Type	Units	XX00	XX25	BR102
Sizing Content	wt. %	3 - 7%	3 - 7%	4 - 8%
Size Compatibility**		Polyamide (nylon)	Polyamide (nylon), Polycarbonate, Polyphenylene Sulfide, Polyurethane, PEI, Polyester	Polycarbonate, Polysulfone, Epoxy

** Compatibility with these Matrices are considered theoretically compatible. Hexcel cannot guarantee their results.

HexTow® Carbon Fiber *Selector Guide*

Important

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For More Information

Hexcel is a leading worldwide supplier of composite materials to aerospace and other demanding industries. Our comprehensive product range includes:

- Carbon Fiber
- RTM Materials
- Honeycomb Cores
- Carbon, Glass, Aramid and Hybrid Prepregs
- Structural Film Adhesives
- Honeycomb Sandwich Panels
- Engineered Core
- Reinforcement Fabrics

For U.S. quotes, orders and product information call toll-free 1-866-556-2662 or 1-800-987-0658. For other worldwide sales office telephone numbers and a full address list please visit **http://www.hexcel.com/contact/salesoffices**.