Use of Innegra Materials in Composites

Visit www.innegratech.com/technical for more information on processing Innegra materials in composites.

Contact us for help with specific projects incorporating Innegra into composites.
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Innegra Fiber

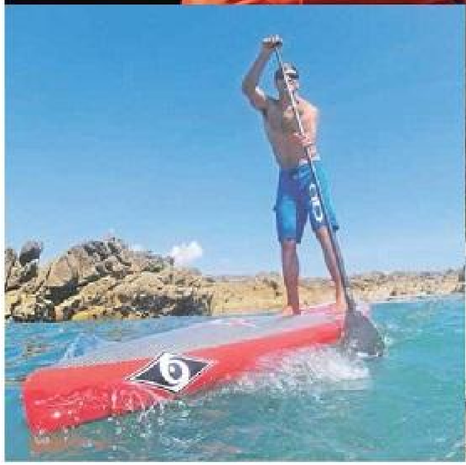
Innegra Technologies LLC, based in Greenville, SC, offers two product lines: Innegra S fiber and Innegra H, hybrid fiber. Both are used in many processes and are available worldwide.

Fibers
- Innegra S
- Innegra H

Reinforcements
- Woven (0/90)
- Braids
- Knits
- Multi-Axial
- Spread Tow
- Woven Tapes
- Woven Uni-Directional
- Scrims
- Prepreg: Uni & Woven

Applications/ Markets
- Aerospace
- Automotive
- Ballistics
- Construction
- Industrial
- Luggage & Cases
- Marine
- Military
- Radomes
- Ropes & Netting
- Sporting Goods

For referrals to Innegra material suppliers contact us at +1-864-631-2800 or sales@innegratech.com



LICENSED USERS

INNEGRA TECHNOLOGIES™

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HIGH PERFORMANCE FIBER

LIGHTWEIGHT // TOUGH // DURABLE // VERSATILE

www.innegratech.com

Innegra™ S Fiber

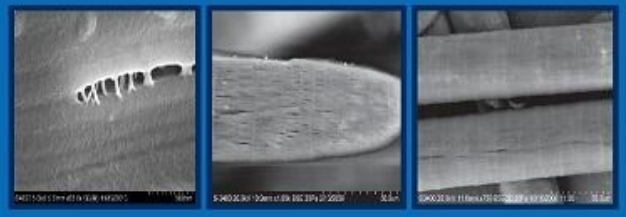
Olefin, Multifilament Fiber

- Lightweight (0.84g/cc)
- Tough
- Hydrophobic
- Excellent Dielectric Properties
- Low Elongation
- Low Creep
- Highly Crystalline

Innegra S Fiber is used with high modulus fibers to increase toughness and durability minimizing catastrophic failure. The fiber provides energy dissipation, vibration dampening and weight reduction.

Denier	**625, 940, 1250, 1880, 2800, 3800**
DTex	**694, 1100, 1389, 2089, 3111, 4222**
Color	**Black or White**
Format	**Untwisted or Twisted (1.0 tpi or 40 tpm)**

Innegra S Fiber is manufactured using a patented process resulting in a density of 0.84g/cc. A closer look at the filaments reveals micro-voids and high crystallinity (over 80%), noted in the SEM images:



The internal structure includes voids and striations or banding. The filaments have a unique textured surface.

Innegra S Typical Properties

Weight per Unit Length**	**Denier**	**625**	**940**	**2800**
	Dtex	**694**	**1045**	**3111**
Filaments per Tow	count	50	75	225
Yield	yd/lb	7143	4749	1594
	m/kg	14,400	9574	3214
Breaking Strength	lbF	11.0	18.6	55.5
	kgF	5.0	8.5	25.2
***Elongation at Break**	%	9.5	9.5	10.0
***Ultimate Elastic (Tensile) Modulus**	gF/ denier	200	200	185
	MPa**	14,828	14,828	13,716
***Ultimate Tensile Strength**	gF/ denier	9.0		
Max. Processing Temperature	F	300		
	C	150		
Dielectric Constant (white fiber only)	Dk	2.2		
Dielectric Loss (white fiber only)	Df	0.0009		

*ASTM D885 @60 tpm/ 1.5 tpi; **Using density of 0.84 g/cc
**other deniers available 1250, 1880, 3800

For a price quote or to order Innegra H or S fiber:
+1-864-631-2800 or fiber@innegratech.com.

www.innegratech.com

Innegra™ H Fiber

Hybrid, Multifilament Fiber

- Innegra S fiber comingled with carbon, glass or basalt
- Various combinations of yarns and deniers available
- Available with white or black Innegra S fiber

Fiber	Range Denier (dTex)	Fiber Fraction % by Weight	Fiber Fraction % by Volume
HIC InnegraS + carbon	2450-10,000 (2722-11,000)	25-50% InnegraS 50-75% carbon	15-33% InnegraS 66-85% carbon
HIG InnegraS + E Glass	925-2500 (1028-2778)	35-75% InnegraS 25-65% glass	15-50% InnegraS 50-85% glass
HIB InnegraS + basalt	1250-3100 (1389-3444)	35-75% InnegraS 25-65% basalt	15-50% InnegraS 50-85% basalt

Most hybridization is done at the fabric level or by layering fabrics. Innegra H fibers combine yarns at the filament level providing an alternative to using multi-layer composites or co-woven fabrics in composites.

Why Use Innegra H?

- Increase durability
- Reduce catastrophic failure
- Minimize multi-layering
- Build Bulk