COMPOSIFLEX

SPRINGS

Accredited Nadcap Administered by PRI
COMPOSITES

NSF Registered to AS9100 and ISO 9001
NSF-ISR

HIGH PERFORMANCE COMPOSITE SPRINGS

Composiflex designs and manufactures a variety of E-glass/epoxy, carbon/epoxy and high temperature glass/epoxy FlexPLY™ springs for numerous industrial equipment applications such as vibratory conveyors. Both cross-ply and unidirectional constructions are available. FlexPLY™ springs can be used as direct replacements for 3M springs.

FlexPLY™
SUPERIOR PERFORMANCE COMPOSITE SPRINGS

FlexPLY™ springs have been proven under demanding fatigue test conditions and have performed to our customers' highest standards.

Composite springs can also be an effective replacement for steel springs, offering advantages such as:

- Increased fatigue life
- High strength to weight ratio
- Tensile strength
- "Customizable" spring rates by varying material construction (fiber/orientation/volume, etc.)
- Corrosion resistance (both chemical & moisture)
- Customizable shapes
- Low notch & scratch sensitivity (toughness)
- Variable modulus of elasticity
- Damping characteristics
- Consistent spring rate (from part-to-part and over cycle life) Noise reduction



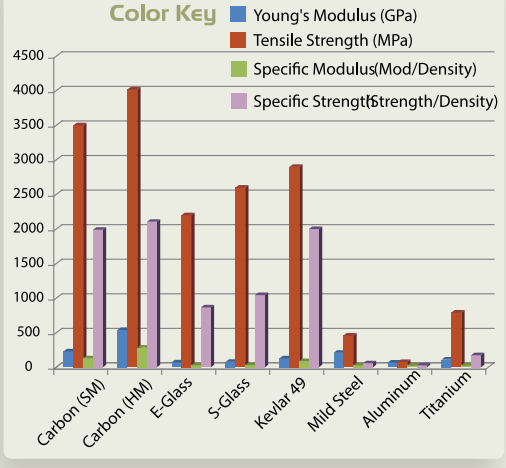

Photos courtesy of Webster Industries and Valley Welding & Machine Works © 2009

Stress Test

FlexPLY™ carbon/epoxy springs perform extremely well in high stress and start/stop conditions. Our success results in part from our use of a high performance epoxy resin. This tough, high elongation resin demonstrates excellent fatigue properties. Although it is a 250° F resin system, the material is able to withstand non-operating temperatures as high as 300° F for short periods. No permanent change in material properties will result from this exposure when normal operating temperatures (up to 150° F) resume. E-glass fibers and carbon fibers, pre-impregnated with resin, can be conveniently layed up into a variety of constructions.

High temperature FlexPLY™ glass/epoxy springs are available to meet requirements up to 300°F in some cases. (Check with Composiflex.) These high temperature springs maintain their physical properties to much higher temperatures than the standard glass/epoxy or carbon/epoxy designs.

Material Properties Comparison Chart



COMPOSIFLEX

is fully integrated to include lay-up, process, machining, finish, and assembly of advanced composite products.

COMPOSITE SPRINGS

Strength Test

Compositflex's stringent test program reliably quantifies the properties and performance of our spring material. The standard E-glass springs have been formally tested by an independent laboratory. Results of a bending test for flexural strength and modulus (ASTM D790-A) are presented in the table to the right. Interlaminar shear properties (ASTM D-2344) were also tested.

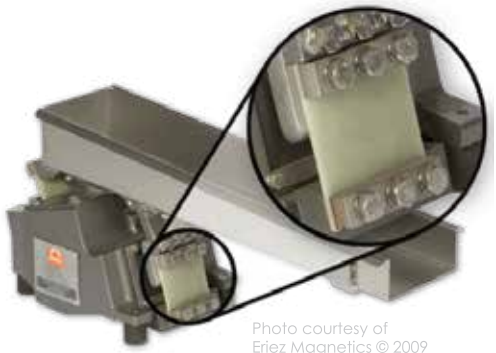


Photo courtesy of Eriez Magnetics © 2009

Flexural strength and shear test

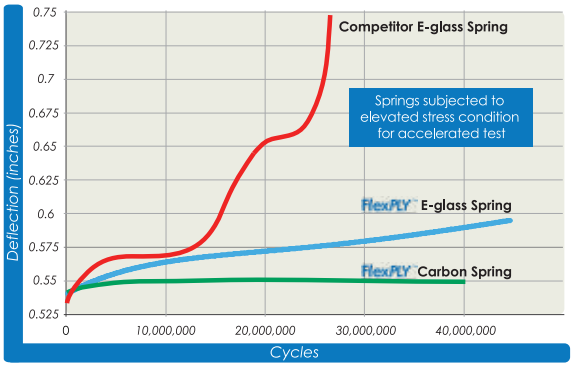
# of Plies	Flexural Modulus (Msi/GPa)*	Flexural Strength (ksi/MPa)*
9	3.8/26.1	123/850
19	4.2/29.2	130/896
25	4.5/31.3	135/931
31	4.6/31.6	129/886
44	4.8/33.3	115/789
1 ply =.01"	Based on 16:1 span to depth ratio	

Carbon/epoxy data available. Contact Compositflex.
** based on unidirectional spring orientation lay-ups only*

Fatigue Test

Spring stiffness is an important design parameter in a vibrating system. Although a small amount of variation is generally taken into account at the design stage, consistency of stiffness over a spring's cycle life translates to optimal system performance. And longer cycle life translates into less maintenance downtime - and lower total cost over the life of the equipment. The chart shows two important characteristics of FlexPLY® springs:

1. *FlexPLY® E-glass springs offer a significant advantage over competitive E-glass springs with regard to consistency of stiffness after cycling. FlexPLY® carbon springs are the ultimate choice for minimizing change in spring stiffness over cycle life.*
2. *FlexPLY® springs last longer!*



Production Processes

The optimal production process choice is based upon final part specifications and production volume. Standard production options include:

Curing (Autoclave, Press and Oven): Cured computer-controlled and recorded heat and pressure.

Resin Transfer Molding (RTM)/VARTM and Light RTM: Mold process that combines fibers and resin.

Filament Winding: Resin coated fibers wound on rotating mandrel.

Engineering: Analysis and testing to support your project.

Press Molding: Compression molded parts or flat panels.

Tooling/Prototype: Production and prototype tooling options available.

Machining: In-house CNC machining controls costs and lead time.

Finishing & Other: Surface prep, painting/coating, and other processes including final assemblies, sub-assemblies, and kits can be created.

Visit compositflex.com for more detailed information. Our experienced engineering staff is available for your technical assistance. Please call 800-673-2544 or e-mail us at info@compositflex.com.

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COMPOSIFLEX
Advanced Composite Products

ISO 9001 Certified
AS9100 Certified

For more than 38 years, Compositflex has been an innovator in the design and manufacture of advanced high-performance composites. Specializing in custom designs, Compositflex currently serves the medical, military, aerospace, ballistic protection, industrial and recreational markets. Compositflex conducts operations in Erie, PA, USA.