

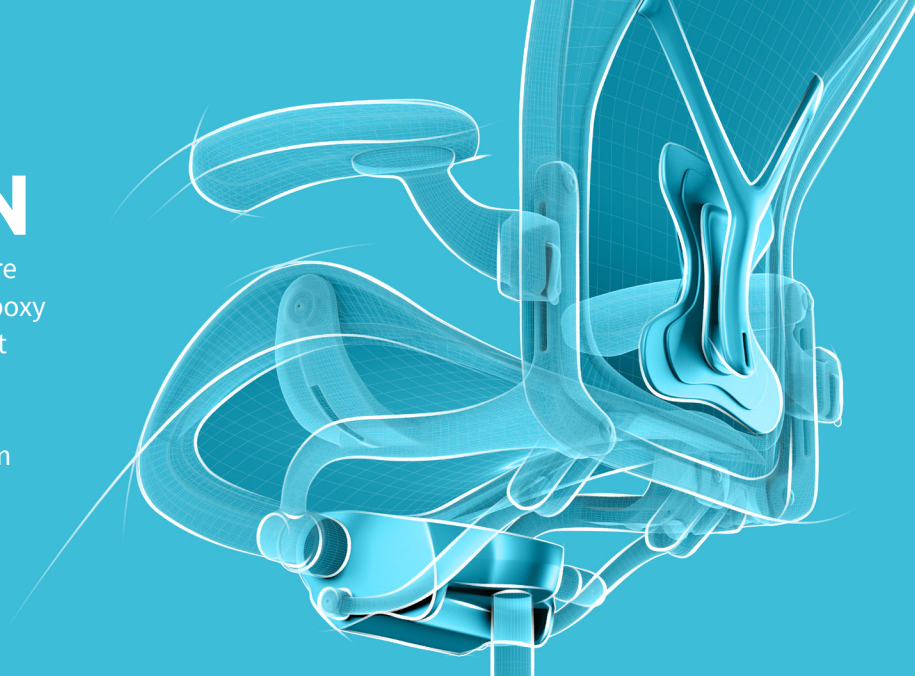
The image shows several composite springs, which are rectangular plates with a fibrous texture and circular holes. Some are light grey, while others are dark grey or black. They are arranged in a stack, with some overlapping. The background is a plain, light-colored surface.

COMPOSITE SPRINGS

VIBRATORY CONVEYORS
AND SEATING

PRODUCT DESCRIPTION

Thermoset composite springs from Avient are engineered with proprietary vinyl ester or epoxy resins and unidirectional fiber reinforcement technologies. These formulations achieve long-lasting, consistent flexing performance in a variety of cantilevered applications, from vibratory sorting and conveying systems to furniture.



FEATURE	BENEFIT
<ul style="list-style-type: none">• Exceptional fatigue resistance• Corrosion resistance• Creep resistance	Fewer failures for longer spring life, less frequent replacement, and a more reliable end product
<ul style="list-style-type: none">• High strength-to-weight ratio—less than half the weight of steel• High spring rate and deep deflection• Custom designs to support off-axis loads	Stronger springs can mean fewer are needed in an application for overall cost savings
<ul style="list-style-type: none">• Common sizes in inventory• Custom design and finishing capabilities	Fast, dependable service, ready-to-install product and customization options to boost your manufacturing efficiency

USES & APPLICATIONS

Sorting and conveying equipment, such as:

- Raw and processed food
- Pharmaceutical products
- Forestry products
- Recycled materials
- Mined/quarried rock, ore, coal, sand
- Powder
- Agricultural products

Furniture, including indoor and outdoor seating

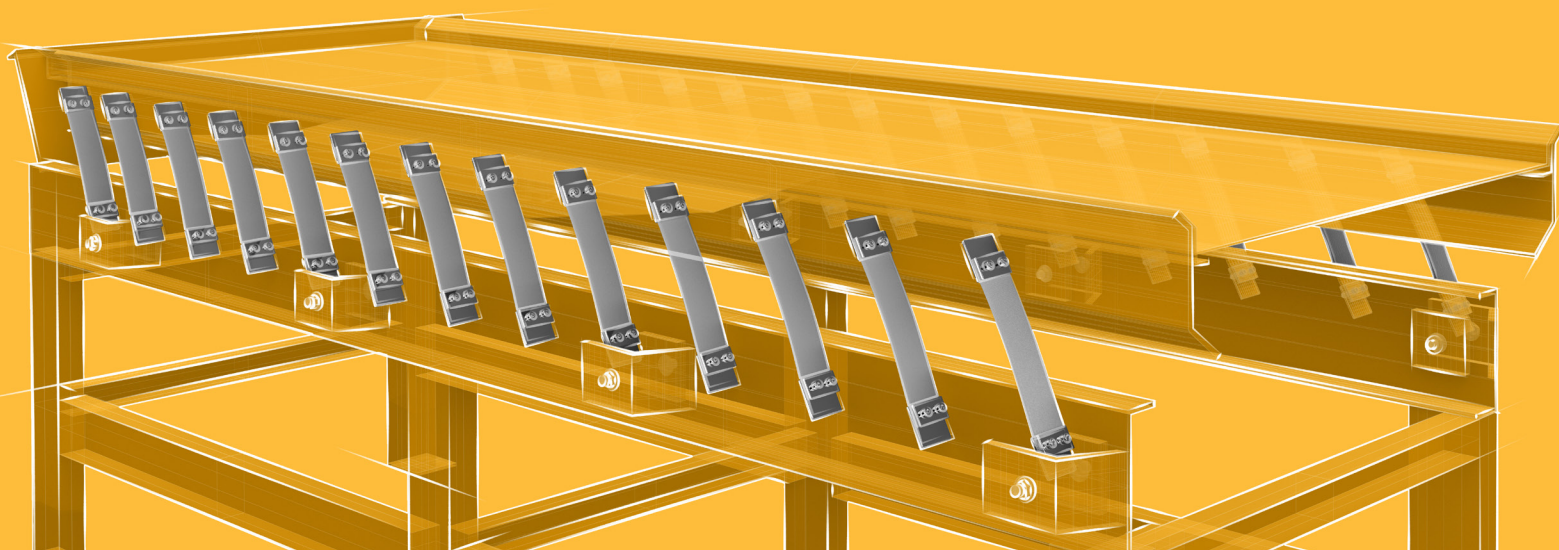
Other applications requiring high cyclic fatigue resistance, repeatability and high performance including high temperature applications up to 300°F (149°C).

PRODUCT SELECTION GUIDE

COMMON SIZES

Table represents examples of common spring sizes. Thicknesses and widths are easily customized to your specific application requirements. Contact Avient for more information.

PART NUMBER	MATERIAL DESCRIPTION	SIZE		WEIGHT/LENGTH	
		in	mm	lb/ft	kg/m
EM01002986	Glass/Vinyl Ester	.250 x 3.0	6 x 76	0.60	0.89
EM01003564	Glass/Vinyl Ester	.250 x 2.5	6 x 64	0.49	0.73
EM01002990	Glass/Vinyl Ester	.266 x 2.5	7 x 64	0.58	0.86
EM01002994	Glass/Vinyl Ester	.312 x 2.0	8 x 51	0.51	0.76
GC-67-UB	Glass/Epoxy	.235x 1.5	6 x 38	0.29	0.43
GC-67-UB	Glass/Epoxy	.235 x 1.75	6 x 44	0.34	0.50
GC-67-UB	Glass/Epoxy	.235 x 2.0	6 x 51	0.38	0.57
GC-67-UB	Glass/Epoxy	.235 x 2.5	6 x 64	0.48	0.71
GC-67-UB	Glass/Epoxy	.250 x 1.5	6.4 x 38	0.31	0.46
GC-67-UB	Glass/Epoxy	.250 x 1.75	6.4 x 44	0.36	0.53
GC-67-UB	Glass/Epoxy	.250 x 2.0	6.4 x 51	0.38	0.57
GC-67-UB	Glass/Epoxy	.250 x 2.5	6.4 x 64	0.51	0.76
GC-67-UB	Glass/Epoxy	.300 x 1.5	8 x 38	0.37	0.55
GC-67-UB	Glass/Epoxy	.300 x 1.75	8 x 44	0.43	0.64
GC-67-UB	Glass/Epoxy	.300 x 2.0	8 x 51	0.49	0.73
GC-67-UB	Glass/Epoxy	.300 x 2.5	8 x 64	0.61	0.91



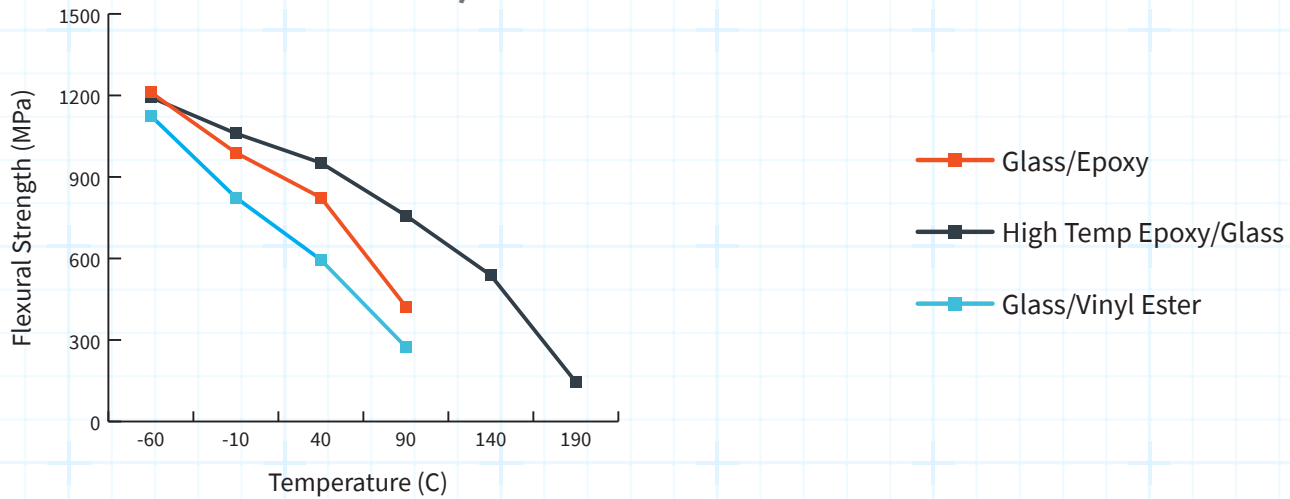
MECHANICAL PERFORMANCE

TYPICAL PROPERTIES

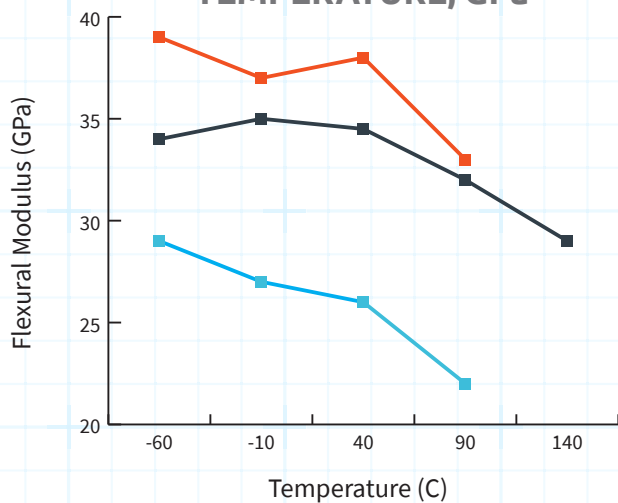
Sample thickness 0.25 in/6.35mm

	TEMPERATURE		FLEXURAL STRENGTH ASTM D790		FLEXURAL MODULUS ASTM D790	
	°F	°C	ksi	MPa	msi	GPa
High Temp Epoxy/Glass	-60	-51	173	1193	5.00	34.48
	70	21	155	1069	5.11	35.23
	160	71	138	952	5.04	34.75
	250	121	110	758	4.70	32.41
	300	149	78	538	4.22	29.10
Glass/Epoxy	-60	-51	176	1211	5.64	38.92
	70	21	143	989	5.36	36.98
	160	71	120	824	5.57	38.41
	250	121	61	423	4.82	33.24
Glass/Vinyl Ester	-60	-51	163	1125	4.19	28.88
	70	21	120	824	3.85	26.51
	160	71	86	595	3.83	26.44
	250	121	40	274	3.19	22.00

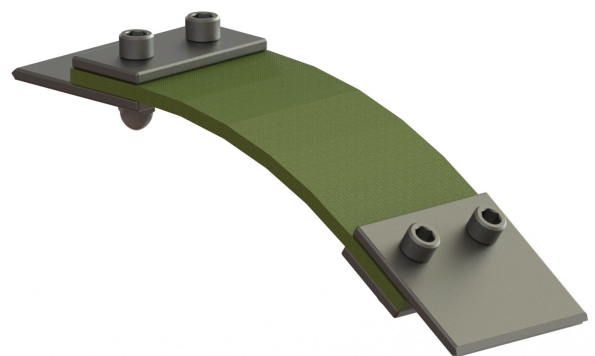
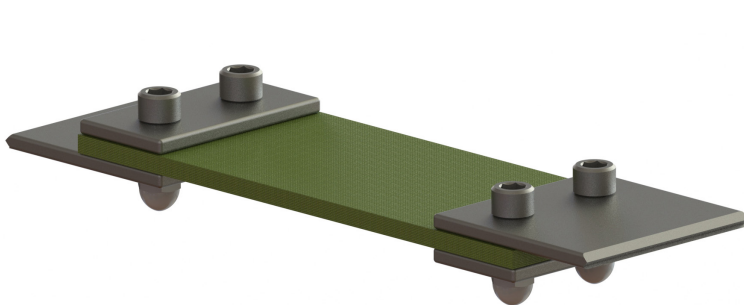
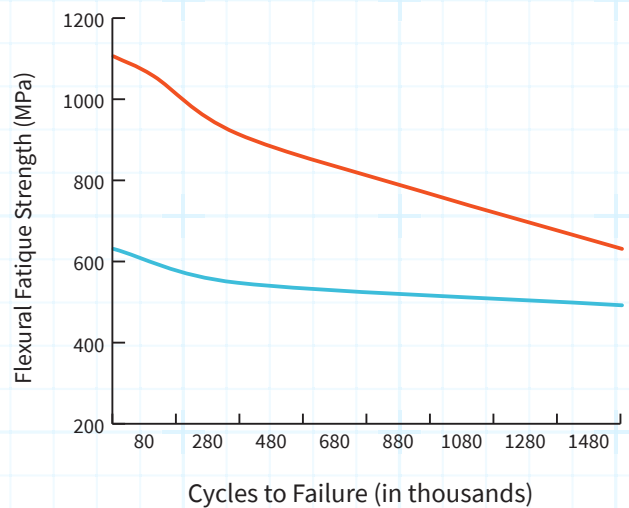
FLEXURAL STRENGTH VS. TEMPERATURE, MPa



FLEXURAL MODULUS VS. TEMPERATURE, GPa



FLEXURAL FATIGUE STRENGTH, MPa



TESTING NOTES

Springs were fatigue tested at 4 hz in a cantilevered loading. The endurance limit was defined when the springs reached 1.5+ million cycles with no loss of spring rate.

- Glass/epoxy endurance limit: 80 ksi (552 MPa)
- Glass/vinyl ester endurance limit: 50 ksi (345 MPa)

INSTALLATION INSTRUCTIONS

Proper installation of composite springs from Avient is essential to achieve optimal performance and maximum service life. We recommend following the guidelines below and contacting us for additional installation and application assistance.

Spring rate adjustments: The spring rate or stiffness for each cross section (thickness x width) is adjustable via the free length of the spring (see illustration). Increasing the free length reduces stiffness and vice versa.

Spring deflection limitations: The free movement or deflection of springs must be limited so that it does not overstress the composite. Deflection from the neutral axis must not exceed the free length $\div 8$ for maximum service life.

SPRING MOUNTING

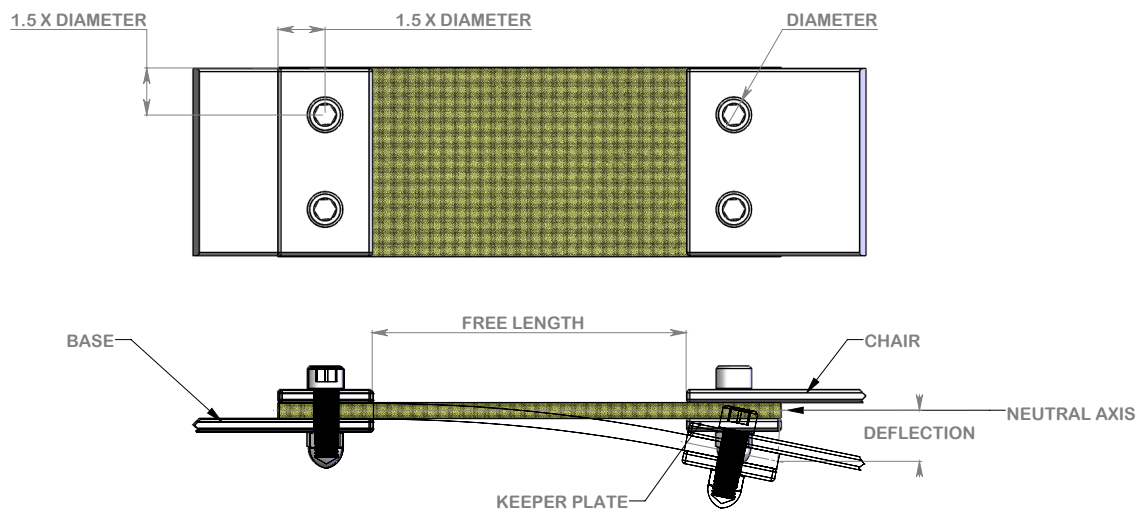
Keeper plates are necessary to evenly distribute the flexural stresses on the springs. The keeper plates must span the entire width of the springs, and have rounded edges to avoid stress concentrations.

Hole locations must be a minimum of 1.5 times the hole diameter from the edges and the ends of the springs to the centerline of the hole (see illustration).

Hole diameters should be $1/32"$ (.8mm) larger in diameter than the diameter of mounting bolts.

Mechanical stop required: In chair installation and applications, a mechanical stop must be added to the chair design to prevent over-stressing of the spring. Contact Avient for more information.

Exposure to finishing operations: One time exposure to elevated temperatures of up to 400°F (204°C) for 15 to 20 minutes, typical for the application of coatings, have no effect on the performance of the composite springs.



To learn more about Avient's advanced composite solutions, call **+1.844.4AVIENT** or visit **www.avient.com/composites**



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