

# Spectra® Fiber

## 900, 1000

### High-strength, lightweight polyethylene fibers

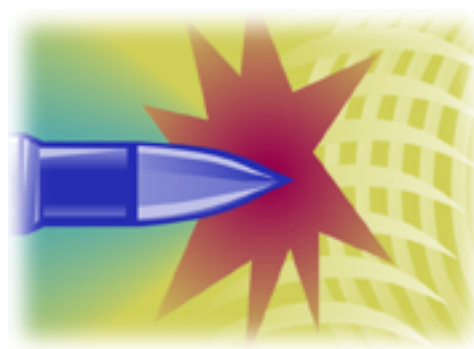
This ultra-high-molecular-weight polyethylene fiber is the strongest and lightest manmade fiber. Spectra's high tenacity makes it 8 to 10 times stronger than steel, 40 percent stronger than aramids and stronger and lighter than virtually every other commercial high-modulus fiber.

With outstanding toughness and extraordinary viscoelastic properties, Spectra fiber can withstand high-load strain-rate velocities. Light enough to float, it also exhibits superior resistance to chemicals, water, and ultraviolet light. It has excellent vibration damping, flex fatigue and internal fiber-friction characteristics, and its low dielectric constant makes Spectra fiber virtually transparent to radar.

AlliedSignal Performance Fibers also converts Spectra fiber into Spectra Shield® and SpectraFlex®, specialty composites for armor.

Spectra fibers are used in:

- Police and military ballistic vests, helmets and hard-armor for vehicles and aircraft;
- Marine lines and commercial fishing nets;
- Industrial cordage and slings;
- Cut-resistant gloves and slash-resistant protective gear;
- Composites for abrasion protection and impact resistance;
- Dental floss.



### Physical Properties

Physical Properties (Nominal)	Spectra 900					Spectra 1000								
Weight/Unit Length	(Denier)	650	650	1200	1600	4800	215	275	375	435	550	650	1100	1300
	(Decitex)	722	722	1333	1778	5333	239	306	417	483	611	722	1222	1444
Ultimate Tensile Strength	(g/den)	28	30.5	30	27	25.5	38	36	35	34.5	38	36	36	35
	(Gpa)	2.40	2.61	2.57	2.31	2.18	3.25	3.08	3.00	2.95	3.25	3.08	3.08	3.00
Breaking Strength	(lbs.)	40.1	44	79	95.2	270	18.0	21.8	28.9	33.1	46.1	51.6	87.3	100.3
Modulus	(g/den)	775	920	850	720	785	1320	1320	1200	1180	1300	1175	1250	1150
	(Gpa)	66	79	73	62	67	113	113	103	101	111	101	107	98
Elongation	(%)	4.1	3.6	3.6	4.4	3.9	2.9	3.1	3.1	3.2	3.1	3.3	3.3	3.4
Density	(g/cc)	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
	(lbs/in <sup>3</sup> )	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Filament/tow		60	60	120	150	480	60	60	60	120	120	120	240	240
Filament	(dplf)	10.8	10.8	10.0	10.7	10.0	3.6	4.6	6.3	3.6	4.6	5.4	4.6	5.4

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# Spectra® Fiber

## 2000



First Stop • First Source • Technical Solutions

## The ultimate lightweight and high-strength performer

The most recent generation of our ultra-high-molecular-weight polyethylene fiber, Spectra 2000 was developed to provide super-fine, super-strong and ultra-lightweight fibers for armor, aerospace and high-performance sporting goods applications. Spectra 2000, our strongest and lightest fiber, is available in deniers as low as 50 and tensile strengths as high as 41 grams per denier. Stronger and lighter than virtually every other commercial high-modulus fiber, Spectra fiber is pound-for-pound 10 times stronger than steel.

Spectra 2000 fiber withstands high-load strain-rate velocities and exhibits outstanding toughness and extraordinary visco-elastic properties. Its extraordinary lightness makes it ideal for aerospace and other weight-sensitive applications. Light enough to float, it also resists degradation from many chemicals, water, and ultraviolet light. It has excellent vibration damping,

flex fatigue and internal fiber-friction characteristics, and its low dielectric constant makes Spectra fiber virtually transparent to radar.

Spectra 2000 fibers are used in:

- Flexible and ultra-light ballistic panels. Fine denier allows for tightly packed fibers that enhance the bullet-stopping performance of the newest generation of police and military ballistic vests.
- Specialty aerospace applications, including radomes, space tethers and cords.
- Ultra-strong, lightweight and superfine fishing line and kite string.



## Physical Properties

Physical Properties	(Nominal)	Spectra 2000					
Weight/Unit Length	(Denier)	50	75	100	130	180	195
	(Decitex)	56	83	111	144	200	217
Ultimate Tensile Strength	(g/den)	34	41	39	38	38	37.5
	(Gpa)	2.91	3.51	3.34	3.25	3.25	3.21
Breaking Strength	(lbs.)	3.7	6.8	8.6	10.9	15.1	16.1
Modulus	(g/d)	925	1450	1450	1320	1350	1320
	(Gpa)	79	124	124	113	116	113
Elongation	(%)	3.1	2.9	3.0	2.8	2.9	2.9
Density	(g/cc)	0.97	0.97	0.97	0.97	0.97	0.97
	(lbs/in <sup>2</sup> )	0.035	0.035	0.035	0.035	0.035	0.035
Filament/tow		48	40	40	40	50	60
Filament	(dpf)	1.0	1.9	2.5	3.3	3.6	3.3

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