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Vectran™

Liquid Crystal Polymer Fiber

A high performance fiber for composite materials

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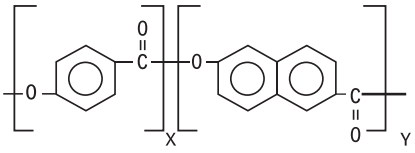
A fiber which combines ultimate demands with outstanding properties.

Vectran™ is Kuraray's high-performance multifilament yarn spun from liquid crystal polymer. The fiber is five times stronger than steel and offers a unique combination of outstanding properties. It is the fiber of choice where others fail to meet performance requirements. **Vectran**™ is used in a wide range of applications.

Molecular Structure

Vectran™ fiber is thermotropic, it is melt-spun, and it melts at a high temperature. The molecular structure is a wholly aromatic polyester. The formula for the **Vectran**™ molecule is shown here.



Dimensional Stability

Vectran™ fiber has a low, negative coefficient of thermal expansion (CTE), which is particularly beneficial for dimensional control of composites.

Chemical Resistance

Vectran™ fiber has good strength retention in exposure to a wide variety of acids, bases, and solvents over a broad range of temperatures.

Physical Properties

PHYSICAL PROPERTIES

Typical:	1670 dtex (1500 den)/300f **Vectran**™ HT
Tenacity:	3.2 GPa, 23 cN/dtex, 26 g/den
Strength Retention:	80% at 80°C, 105% at 0°C, 115% at -70°C
Initial Modulus:	75 GPa, 529 cN/dtex, 600 g/den
dtex(denier)/Filament:	2.8 to 5.5 (2.5 to 5.0)
Density:	1.4 g/cc
Shrinkage:	Water (100°C) <0.2%; Air (180°C) <0.2%
Elongation:	3.8%
Moisture Regain:	<0.1%

Special features

- Ultra high strength
- Ultra high modulus
- Low elongation
- Very low creep
- Abrasion resistance
- Excellent flex fatigue
- Cut/slash resistance
- Vibrating damping
- Low moisture absorption
- Chemical resistance
- Dimensional stability
- Impact resistance

Application areas

- Aerospace industry
- Sporting goods
- Composite materials
- Protective gloves and clothing
- Ropes and cables
- Lines and tethers
- Medical applications
- Industrial fabrics
- Inflatable fabrics
- Geotextiles
- Military goods
- Sailcloth

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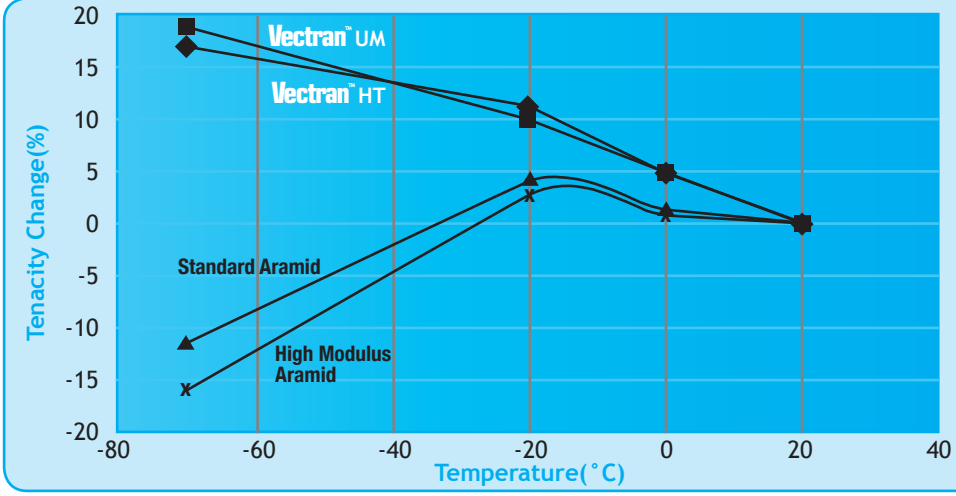
Fiber Thermal Properties

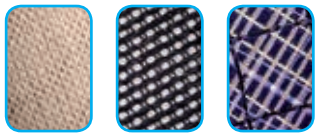
	Vectran™		Aramid	
	HT	UM	Standard	High Modulus
LOI	**28**	**30**	30	30
M.P., °C	**None**	**350**	None	None
HAS (Hot air shrink, 180°C, 30 minutes), %	**<0.2**	**<0.1**	<0.2	<0.1
BWS (Boiling water shrinkage, 100°C. 30 minutes), %	**<0.2**	**<0.1**	<0.2	<0.1
50 % Strength retention Temperature, °C	**145**	**150**	430	230
TGA (20% weight loss), °C	**>450**	**>450**	>450	>450

Equilibrium Moisture Regain

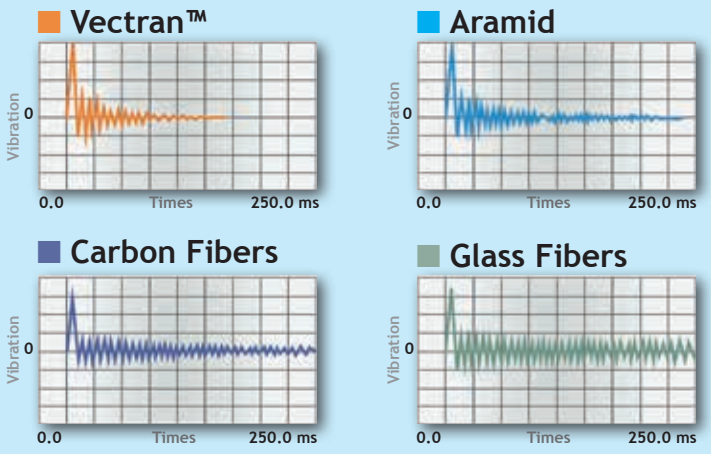
Temperature (degree°C)	Relative Humidity (%)	Vectran™ HT	Vectran™ UM	Aramid Standard	Aramid High Modulus
20	65	**<0.1**	**<0.1**	4.2	4.1
20	80	**<0.1**	**<0.1**	4.8	4.8
20	90	**<0.1**	**<0.1**	5.4	5.5

Low Temperature Properties of Vectran™ Fiber





VIBRATION DAMPING



Periodic Damping of single fibers Reinforced Composite (Matrix Resin: Epoxy)

A vibration damping measurement system and comparison of vibration damping characteristics for glass fiber, carbon fiber, aramid fiber, and Vectran fiber are found in these figures. The differences are apparent and demonstrate that Vectran™ fiber is ideal for vibration damping in a wide range of applications.

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Adding value to your products - worldwide

Kuraray is a medium-sized diversified global manufacturer of chemicals, polymers, films, fibers and textiles. The company began producing fibers based on synthetic polymers in 1926. Today Kuraray has more than 9000 employees, with ISO certified manufacturing assets in Japan, Europe, China, and the U.S, and Research and Technical centers in Kurashiki, Japan and Houston, Texas. Kuraray has been the global manufacturer of high performance **Vectran**™ LCP fibers since 1990. Kuraray is a member of the Dow Jones Sustainability Index, MS-SRI Global 100, FTSE4Good, and the Japan Responsible Care Council.

Kuraray - worldwide representatives:

Kuraray America, Inc.

460-E Greenway Industrial Drive
Fort Mill, SC 29708
USA

Tel.: +1 804-748-4146
Fax: +1 804-547-5888

www.kuraray.us.com

Kuraray Co., Ltd.

Umeda Hankyu Building Office Tower,
8-1, Kakudacho, Kita-ku Osaka 530-8611,
Japan

Tel.: +81 6-7635-1213
Fax: +81 6-7635 1233

www.kuraray.co.jp

Kuraray Europe GmbH

Philipp-Reis-Straße 4
65795 Hattersheim am Main
Germany

Tel.: +49 69-305-85354
Fax: +49 69-305-98-85377

www.kuraray.eu

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