

Fibers, Specialty Organic

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Abstract

This report covers organic fibers used in specialty high-performance, textile, or functional applications. High-performance fibers are generally characterized by their outstanding tensile strength and stiffness (modulus), as well as resistance to heat, fire, and chemical agents that normally degrade conventional fibers. Applications include use in aerospace, biomedical, civil engineering, construction, protective apparel, geotextiles, and electronics. Most of the organic fibers covered in this report are made by a limited number of producers; sometimes there is just one global producer. Global demand can be as low as 100 metric tons per year, and some fibers are only produced in pilot plant operations. These fibers usually require expensive raw materials made by a limited number of producers.

Specialty organic fibers generally possess one or more of the following properties:

- Excellent fire resistance
- Superior thermal resistance
- Good chemical resistance
- Excellent wear resistance
- High modulus and/or high strength
- Light weight

Each type of specialty organic fiber covered in the report is classified under one of the following general categories:

Specialty organic fiber categories	
High-performance fibers	Specialty apparel fibers
Aramid fibers	Chlorofibers
Fluoropolymers	Vinyon
Polybenzimidazole fibers	Saran
Polybenzoxazole fibers	Polyvinyl alcohol fibers (vinal)
Polyethylene fibers, high-strength	Elastomeric fibers
Polyimide fibers	Spandex
Polyamideimide fibers	Rubber threads
Polyacrylonitrile fibers, partially oxidized	Other specialty organic fibers
Novoloid fibers	Special-function fibers
Liquid crystal polymer fibers	Polymeric optical fibers
Other high-performance fibers	Hollow fibers

Source: IHS Markit

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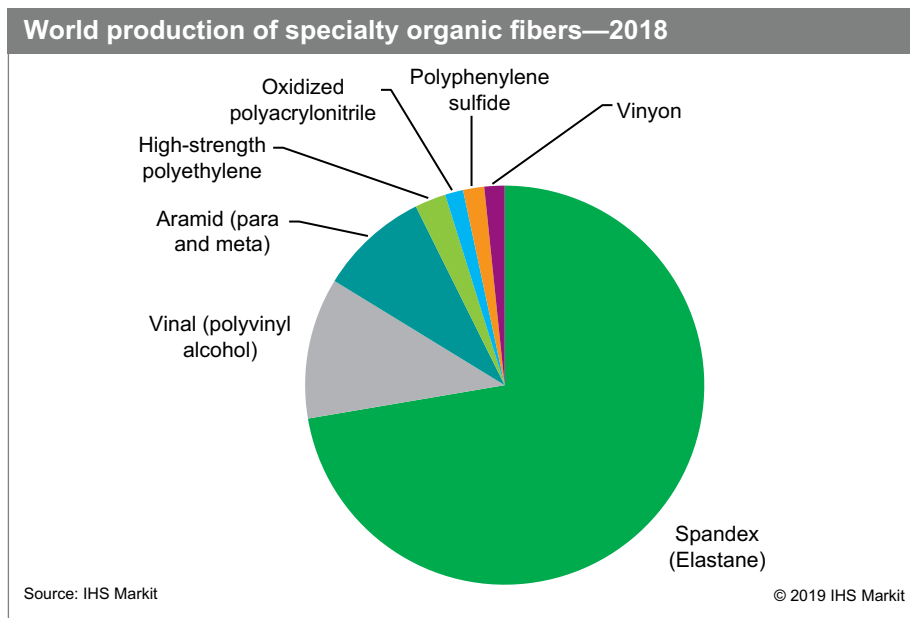
Within each of these general categories, individual fibers are presented in descending order of economic importance.

Contacts

Koon-Ling Ring • Koon-Ling.ring@ihsmarkit.com
Maria deGuzman • Maria.deguzman@ihsmarkit.com



The following pie chart shows world production of the major specialty organic fibers (volume basis):



Overall, these high-performance fibers will continue to have relatively good demand in the next several years. For example, aramid fiber consumption is expected to increase at over 6% per year during the next five years, with even higher growth in China. Likewise, high-strength polyethylene fiber consumption is anticipated to have annual growth of 5–6%, driven by use in ballistic materials, industrial fabrics, composite reinforcements, and ropes and cables.

Ballistic protection is one of the more important growing sectors, where para-aramid (e.g., Kevlar® and Twaron®) and high-strength polyethylene fibers are used. Demand has increased strongly during the 2000s as a result of greater concern over terrorist attacks and the US military involvement in the Middle East. Although the United States will continue to withdraw troops from this region (maybe more slowly than originally planned), the government will also continue military spending to combat other terrorist groups, and bolster other programs around the world. This military action should continue to support the growth of such fibers. Several other niche areas where these fibers are used include fire-protective clothing/fire-protection apparel, hot gas filtration media, aircraft brakes, optical fibers, dialyzers, and special consumer apparel.

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IHS Markit Customer Care

CustomerCare@ihsmarkit.com

Americas: +1 800 IHS CARE (+1 800 447 2273)

Europe, Middle East, and Africa: +44 (0) 1344 328 300

Asia and the Pacific Rim: +604 291 3600

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