

中國  
巨石  
CHINA  
JUSHI

E9

Ultra High Modulus  
Glass Fiber

A Brand New Solution For High End Composites  
Having A Modulus Over **100** GPa



## COMPANY PROFILE

China Jushi Co., Ltd. specializes in the production of glass fiber. The company has attained the leadership position in the global glass fiber industry in terms of capacity, technology, R&D, quality and marketing. Jushi people adhere to its core values of “Conduct, Innovation, Responsibility, Learning, Passion” to build the company into an international corporation with the largest scale, leading technology, excellent team, lean management, powerful execution, outstanding operating results and high quality growth. China Jushi strives to lead the modernization of China’s glass fiber industry and maintain the leadership position in the global glass fiber industry through endless pursuit of innovation and excellence.

# GOALS

E9 ultra-high modulus glass fiber represents Jushi's latest breakthrough in glass technology. With a modulus of over 100 GPa, E9 sets a new milestone in the fiberglass industry. Its modulus is even higher than that of E8 and S-glass, allowing it to render unique properties to the glass and glass fiber reinforced composites. The mass production of E9 glass fiber is realized by using the advanced production technology of Jushi, which greatly increases the cost performance and competitiveness of ultra-high modulus glass fiber. E9 offers a new and higher performance technology platform to bring new solutions and values to our customers and create more opportunities for glass fiber reinforced composites to expand in high-end applications.





# REVOLUTIONARY GLASS

## A NEW SOLUTION FOR HIGH-END COMPOSITES

### UNIQUE BENEFITS OFFERED BY E9 GLASS FIBER

#### Higher Modulus

A modulus over 100GPa

36% higher than traditional E-glass, 12% higher than E7

#### Higher Strength

60% higher than traditional E-glass

12% higher than E7

#### Better High Temperature Resistance

Softening point 132°C higher than traditional E-glass, and coefficient of expansion 21% lower than traditional E-glass

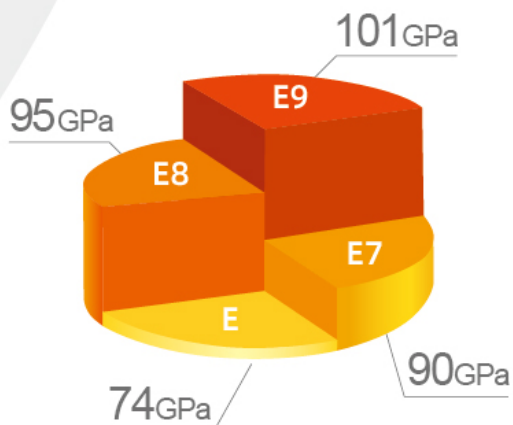
#### Higher Fatigue Resistance

Much higher than traditional E-glass, ensuring higher reliability of finished products

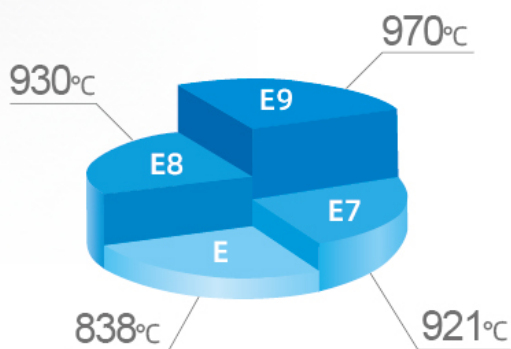
#### More Environment-friendly

Using boron-free and fluorine-free glass composition to ensure clean production

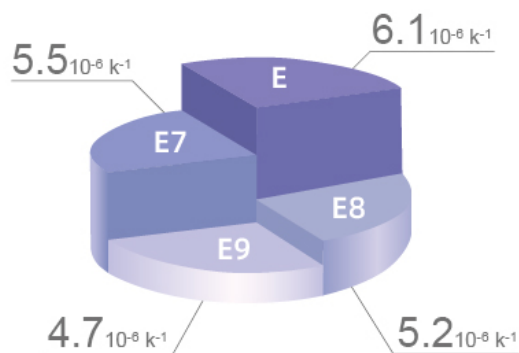
### ELASTIC MODULUS



### SOFTENING POINT



### EXPANSION COEFFICIENT



PROPERTY	TEST METHOD	UNIT	E	E7	E8	E9
Elastic Modulus	ASTM E1876	GPa	74	90	95	101
Softening Point	ASTM C338	°C	838	921	930	970
Expansion Coefficient	ASTM D696	10 <sup>-6</sup> k <sup>-1</sup>	6.1	5.5	5.2	4.7
Refractive Index	ASTM C1648	/	1.566	1.562	1.568	1.573
Dielectric Constant (23°C, 1MHZ)	ASTM D150	/	6.7	7.0	6.9	6.8

ITEM	TEST METHOD	UNIT	E	E7	E8	E9
Retention rate in acidic solution	Soaking in 10%HCl solution at 23°C for 24 hours	%	81.6	99.9	99.9	99.6
Retention rate in alkaline solution	Soaking in 0.5M NaOH solution at 23°C for 24 hours	%	99.5	99.7	99.7	99.7
Retention rate in boiling water	Boiling in water at 100°C for 24 hours	%	99.4	99.7	99.7	99.7
Retention rate in sea water	Soaking in sea water at 23°C for 30 days	%	99.4	99.8	99.9	99.9

Note: The above tested products have a uniform filament diameter.

# EXCELLENT MECHANICAL PROPERTIES

As a new generation glass fiber of Jushi, E9 has higher modulus and strength, which give even better mechanical properties, fatigue resistance and impact resistance to composite materials. E9 therefore is able to meet higher requirements for composites design and use environments.

E9 glass fiber can be widely used in wind power, infrastructure, transportation, aerospace, and many other fields. Typical applications include large wind blades, optical cable reinforcements, aircraft parts, automobiles, temperature resistant parts and sports equipment.

TEST SAMPLE	PROPERTY	TEST METHOD	E	E7	E8	E9
Impregnated roving, epoxy resin	Tensile modulus ( GPa )	ASTM D2343	73-75	89-91	95-98	100-103
	Tensile strength ( MPa )	ASTM D2343	1900-2000	2800-3000	3100-3500	3100-3500
UD fabric laminates, epoxy resin	Tensile modulus ( GPa )	ISO 527-5	/	49-50	51-52	54-55
	Tensile strength ( MPa )	ISO 527-5	/	1200-1300	1300-1400	1380-1500
	Fiber volume content ( % )	ISO 1172	/	55	55	55



## CERTIFICATIONS

China Jushi adheres to its fundamental Management principles: "Apply science and technology for development, Build the brand name to expand market share, Strengthen management to improve efficiency and Employ talented people to enable future growth". We own proprietary, world-class core technologies for large E-glass fiber furnaces and high performance glass fibers, among others. We are certified to ISO9001, ISO14001, OHSAS18001, ISO10012 and ISO17025. Our testing center is certified by China National Accreditation Board for Laboratories (CNAS) and Germanischer Lloyd (GL). The brand name "Jushi" has been listed as "China Top Brand", and our principal products are approved by DET NORSKE VERITAS (DNV), Germanischer Lloyd (GL), Lloyd's Register (LR), China Classification Society (CCS), Biro Klasifikasi Indonesia (BKI) and Attestation de Conformité Sanitaire (ACS).



## TECHNICAL COLLABORATION AND SUPPORT

China Jushi possesses world class core technologies and advanced testing and analysis capabilities for glass, organic chemistry, fiberglass and composites. We have established a global network of marketing and technical service professionals to help our customers solve problems in materials development and process optimization. We collaborate closely with customers to address market challenges and promote growth of the composites industry.

We are ready to share with you all the information on E9 glass fiber reinforcements as well as our considerable knowledge of compounding and molding technology and processes.



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★ All the data given in this brochure is preliminary and China Jushi reserves the right to update or modify the data without prior notice.



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