



E6-CR Glass Fiber

Best Corrosion Resistance Solution for High-Performance Composite Material



E6-CR

Boron-free Fluorine-free Glass Fiber

Company Profile

Jushi Group specializes in the production of glass fiber. The company has attained the leadership position in the global glass fiber industry in terms of Output, Technology, R&D, Quality and Market share. Jushi Group is a Chinese national, key high technology enterprise, operating a distinguished Post-Doctoral program.

Jushi Group always adheres to its fundamental Management principles:

- Apply science and technology for development,
- Build the brand name to expand market share,
- Emphasize management to improve efficiency,
- Employ talented people to enable future growth.

The company owns proprietary, world-class core technologies for large E-glass fiber furnaces, C-glass fiber furnaces and waste fiber recycling furnaces. The company has its own core technology of world-class and achieved certifications to ISO9001, ISO14001, ISO18001, ISO12001 and ISO17025. Its testing center has been certified by both China National Accreditation Board for Laboratories (CNAS) and Germanischer Lloyd (GL). The glass fiber rovings and chopped strand mats under the "Jushi" brand have been listed as "China Top Brand" products and the trademark "JUSHI" has been recognized as "China Famous Trademark". The principal products of Jushi Group have been approved by China Classification Society (CCS), DET NORSKE VERITAS (DNV), Lloyd's Register (LR) and Germanischer Lloyd (GL).

Jushi Group produces E-glass and C-glass glass fiber products including rovings, chopped strands, chopped strand mats, woven rovings and electrical yarns and fabrics in over 20 product categories and 1000 specifications. The products are sold in all provinces in China and exported to over 100 countries. The key regions include America, Europe, Asia, Africa, Oceania and Middle East, with export accounting for 50% of the total sales volume. Jushi people adhere to our core values of "Behavior, Innovation, Responsibility, Learning, Enthusiasm" to build the company into an international group with leading manufacturing scale, advanced technology, talented team, excellent management, powerful execution, great achievements and fast growth. Jushi Group 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.



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Best Corrosion Resistance Solution for High-Performance Composite Materials



To achieve clean production and minimize environmental footprint, Jushi Group successfully developed E6[®] enhanced glass fiber in 2008. With the rapid development of new applications, the design of fiberglass composite parts is becoming more and more demanding, for example, both the manufacturers and end users want products with long-term consistency and reliability. To meet these demands, as well as to meet the technical requirements from corrosion resistance application field, the development of E6-CR glass fiber was successfully completed by Jushi Group and was commercially available since 2012.

E6-CR enhanced glass fiber is a new E-glass fiber, with enhanced properties. It combines all the benefits of E6[®] glass fiber with excellent corrosion resistance, thus meeting the requirements of the most demanding applications. E6-CR provides customers with best solutions for corrosion resistance.

E6-CR GLASS FIBER

Excellent corrosion resistance



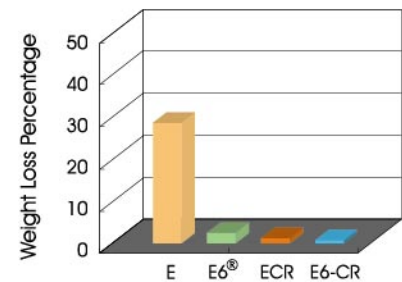
Compared with typical E6[®] glass fiber, E6-CR offers the following unique benefits:

- Higher chemical stability
- Boron-free fluorine-free, to ensure clean production

E6-CR glass fiber is produced with a unique glass formulation, providing significant improvement in chemical corrosion resistance in neutral, acidic or alkaline solutions. The improvement in corrosion resistance is especially significant in the acidic environments. E6-CR is therefore particularly suitable for the applications in corrosive environments.

Item	Testing method	E	E6 [®]	ECR	E6-CR
Weight loss in acidic solution	Soaking in 10%HCl solution at 23°C for 24 hours	18.39%	0.45%	0.21%	0.03%
Weight loss in alkaline solution	Soaking in 0.025M Na ₂ CO ₃ at 23°C for 24 hours	0.16%	0.10%	0.06%	0.02%
	Soaking in 0.5M NaOH solution at 23°C for 24 hours	0.46%	0.34%	0.27%	0.12%
Weight loss in boiling water	Boiling in water at 100°C for 24 hours	0.53%	0.19%	0.20%	0.04%

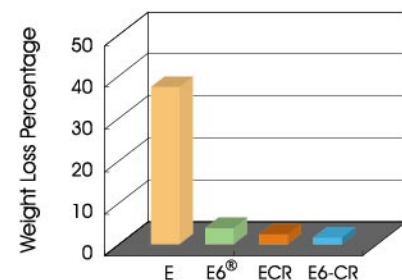
Weight loss comparison of E, E6[®], ECR and E6-CR glass fibers soaking in 10% HCl solution at 96°C after 24 hours



Physical and Electrical Properties of ECR, E6[®] and E6-CR Glass Fibers:

Property	Testing method	Unit	ECR	E6 [®]	E6-CR
Density	ASTM D1505	g/cm ³	2.66	2.66	2.65
Refractive Index	Oil immersion method	/	1.576	1.566	1.566
Expansion Coefficient	ASTM D696	10 ⁻⁶ K ⁻¹	5.90	6.01	5.98
Strain Point	ASTM C336	°C	670	667	678
Annealing Point	ASTM C336	°C	715	712	722
Softening Point	ASTM C338	°C	900	898	902
Elastic Modulus	Sonic method	GPa	80	79	82
Volume Resistivity (23°C)	ASTM D257	Ω · cm	15.3	15.1	15.0
Dielectric Constant (23°C, 1MHz)	ASTM D150	/	7.2	7.1	7.0

Weight loss comparison of E, E6[®], ECR and E6-CR glass fibers soaking in 10% H₂SO₄ solution at 96°C after 24 hours



E6-CR REINFORCEMENTS

Excellent environment durability

In the future, end-use composite products will operate in even harsher environments and the end-users will expect enhanced durability. Compared with E6[®] glass fiber, E6-CR enhanced glass fiber reinforced composite materials offer better corrosion resistance and temperature endurance, making composite parts more reliable and cost effective.

Superior Mechanical Properties

Test sample	Property	Standard	E6 [®]	E6-CR
800g/m ² Woven roving	Glass content (%)	ISO 1172	54	54
	Tensile strength (MPa)	ISO 527-4	356.4	363.5
Unsaturated polyester	Tensile modulus (GPa)	ISO 527-4	22.0	22.5
Hand laid laminates	Flexural strength (MPa)	ISO 14125	412.2	418.2
	Flexural modulus (GPa)	ISO 14125	19.5	20.1

Chemical Stability

Degradation (% Loss) after boiling in water for 7 days

Sample	Property	Standard	E6 [®]	E6-CR
800g/m ² woven roving	Glass content (%)	ISO 1172	57	57
	Tensile strength (MPa)	GB/T 1447	38.1%	11.4%
Unsaturated polyester	Tensile modulus (GPa)	GB/T 1447	2.8%	1.9%
Hand laid laminates	Flexural strength (MPa)	GB/T 1449	29.5%	22.3%
	Flexural modulus (GPa)	GB/T 1449	2.6%	1.8%

Temperature Resistance

Glass fiber reinforced composites are increasingly used in harsh environments, such as pipes used in oil-field processing or in treatment of high temperature waste gases. Drastic changes in ambient temperature can reduce the strength and thus shorten the operating life of composite materials.

The composite samples tested below were dried for 10 days at 180°C, and then put in an -60°C environment for another 10 days. The relative loss of properties after the exposure is shown in the table below.

Sample	Property	Standard	E6 [®]	E6-CR
800g/m ² woven roving	Glass content (%)	ISO 1172	58	58
	Tensile strength (MPa)	GB/T 1447	4.9%	4.5%
Unsaturated polyester	Tensile modulus (GPa)	GB/T 1447	6.8%	6.1%
Hand laid laminates	Flexural strength (MPa)	GB/T 1449	17.0%	15.4%
	Flexural modulus (GPa)	B/T 1449	14.0%	12.8%

ENVIRONMENTAL PROTECTION

Become A Model for Clean Production

Jushi Group is committed to improving our environmental footprint. We have invested heavily in the most modern technologies available to reduce pollutant emissions into our environment. Improved oxygen firing technology reduced total waste gas emissions from the furnace by 80% and the nitrogen oxide emissions by over 90%. State of the art glass recycling technology ensures zero discharge of process waste glass fiber. Modern waste purification technology enables zero discharge of industrial waste water from our production process. E6-CR glass fiber is produced by more scientific production technology and process which not only improve the product performances, but also control air pollutants at source. The development of E6-CR glass fiber is consistent with our constant commitment to social responsibility and sustainability. Not only have we achieved the goal of improving our glass fiber products, but we also have improved our environmental footprint at the same time.



E6-CR



CUSTOMER AND TECHNICAL SUPPORT ORGANIZATION

Offer Best Technical Support

Jushi Group 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 customers solve problems in materials development and process optimization. We collaborate closely with customers to address market challenges and promote the growth of the composites industry.

We will share with you all the information on E6-CR glass fiber reinforcements as well as our considerable knowledge of compounding and molding technology and processes.

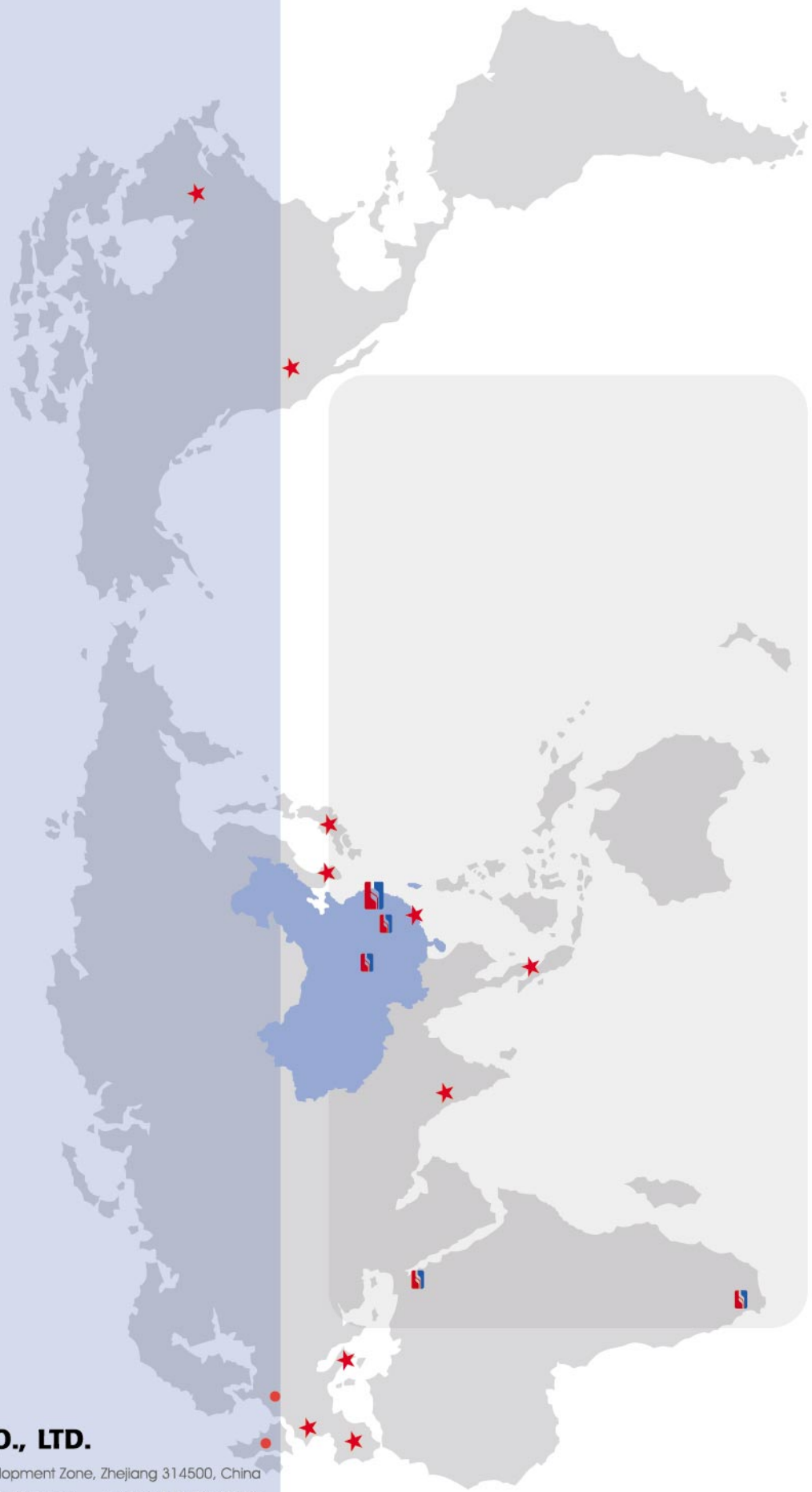


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You can also contact your regional Jushi sales representative for any query you may have.

* All the data given in this brochure is preliminary and we reserve the right to update or modify this data without notice.





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