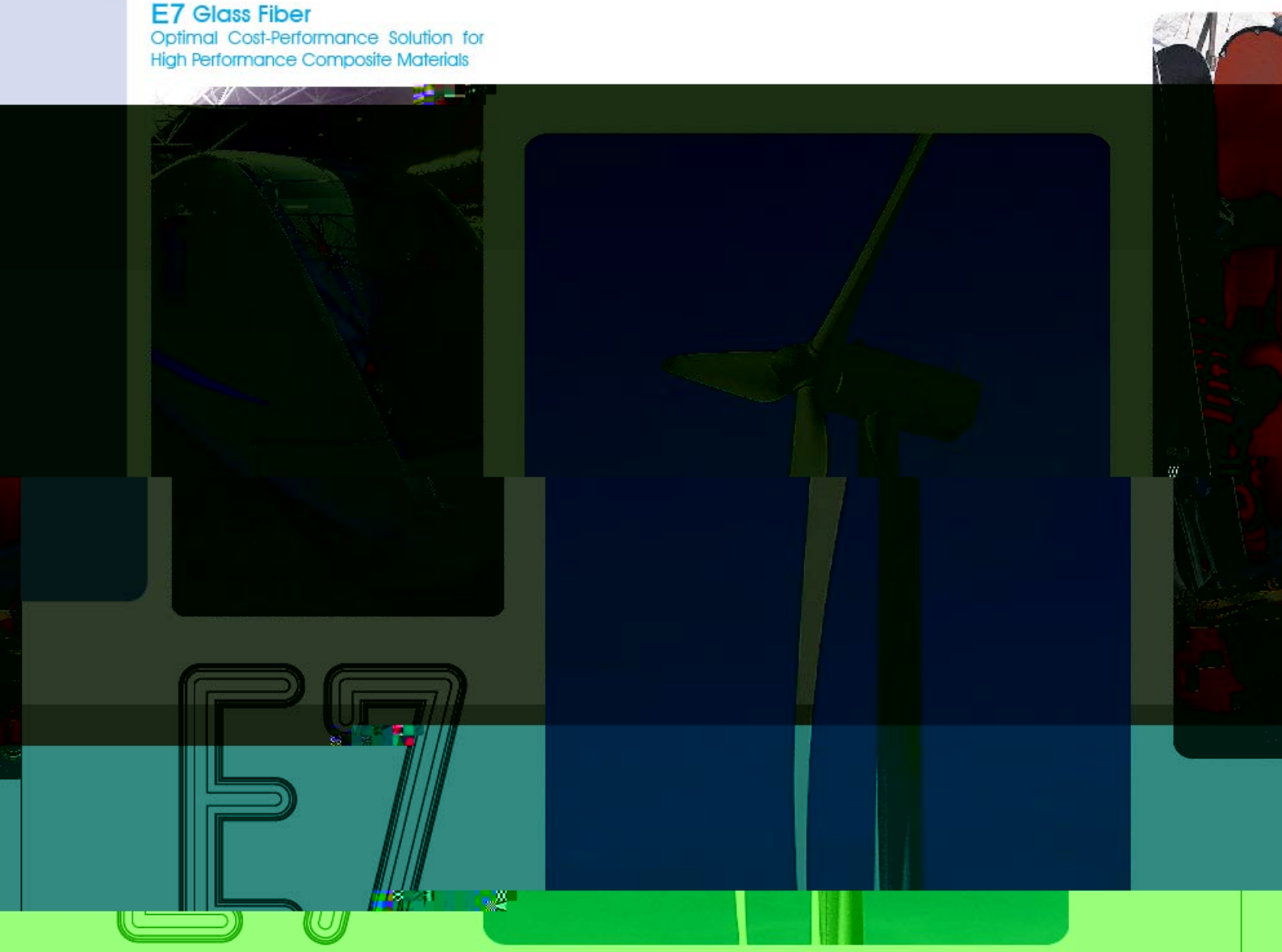
JUSHI®

E7 Glass Fiber
Optimal Cost-Performance Solution for
High Performance Composite Materials



New High Performance
Glass Fiber

中国巨石股份有限公司
CHINA JUSHI CO., LTD

Company Profile

Jushi Group specializes in the production of glass fiber. The company has attained leadership position in the global glass fiber industry in terms of Output, Technology, R&D, Quality and Market share. Jushi

- ...ze management to improve efficiency and
- 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 (D...

E7 New High Performance

GOALS

Provide Optimal Cost-Performance Solution for High Performance Composite Materials

...nts of various high performance composite materials, such as large wind blades, high performance pultruded profiles and high pressure vessels, all of which require higher strength, stiffness, and fatigue-resistance. In the meantime, although the production of S... ...s been widely known, its production cost has exceeded the range that most composite industries can bear. To meet the requirements of high end markets, as well as to protect our environment and achieve clean production, after successfully launching E6 glass fiber in 2009, Jushi Group has developed E7 High Strength and High Modulus Glass Fiber with even better performance in 2010. The volume production of E7 glass fiber with large refrac... furnaces makes it possible to meet the large demand for high performance glass fiber from... manufacturers of large wind blades, high pressure vessels and pultruded products and offe... customers in the composites industry an optimal cost- performance solution.

E7 is a high strength and high modulus glass fiber which is produced using a special low-calcium glass formulation with less than 11.5% of calcium oxide content, and improves... product performance significantly. The chemical composition of E7 falls outside the range ... standard E glass according to ASTM D578-00, but inside the category of R glass according... ISO 2078 standard. While having all the advantages of traditional E glass, E7 features technological breakthroughs in modulus, strength and softening point and can meet specia... needs of the high end...

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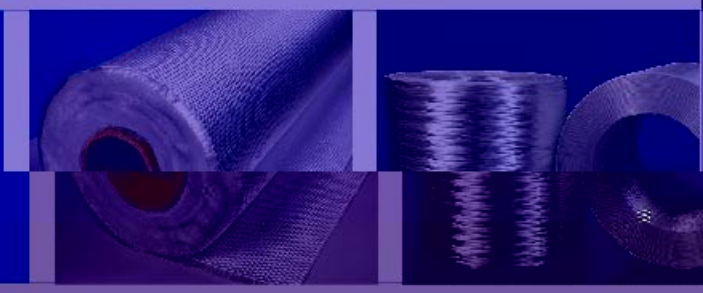
E7 GLASS FIBER

Boost the High Performance of Composite Materials

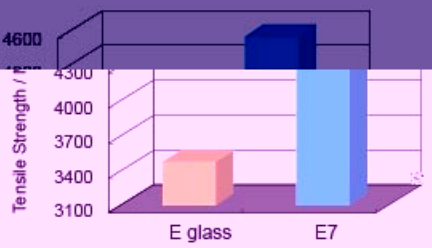


Compared with traditional E glass, E7 delivers the following unique advantages:

- *Higher strength, 30% higher than traditional E glass;*
- *Higher modulus, 23% higher than traditonal E glass;*
- *Higher softening point, 83℃ higher than traditional E glass.*

Therefore, E7 is suitable for use in composite materials which require higher mechanical properties.

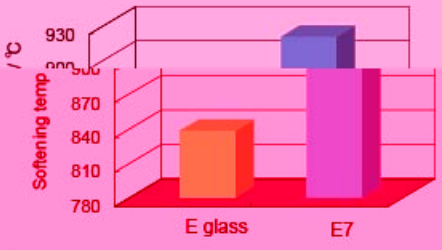
Comparison of Tensile Strength between E7 and E glass Fiber:



Mechanical and Electrical Properties of E7 and Traditional E-glass:

Property	Testing method	Unit	E	E7
Density	ASTM C693	g/cm^3	2.60	2.60-2.61
Refractive Index	ASTM C1648	/	1.566	1.562
Expansion Coefficient	ASTM D696	10^{-6} K^{-1}	6.1	5.5
Softening Point	ASTM C338	℃	838	921
Elastic Modulus	ASTM E1876	GPa	72	89
Dielectric Constant (23℃, 1MHz)	ASTM D150	/	6.7	7.0

Comparison of Softening Point between E7 and E glass Fiber:



Comparison of Weight Loss in 10% H_2SO_4 at 96℃ after 24 and 168 hours between E7 and E glass fiber:

E7 has a reasonable chemical composition which has not only obviously

E7 REINFORCEMENTS

Open New Space for High End Applications of Composites

The use of glass fiber reinforcements allows customers to design high performance composites beyond the limits of the polymer material itself. Jushi E7 glass fiber enables even higher composite performance. Compared with E-glass, composites based on E7 reinforcements have better mechanical properties including higher strength, modulus and fatigue resistance. E7 reinforcement will expand the use of high performance composites in large wind blades, high pressure vessels, pultrusion profiles and many other applications.

The exiting production technology with large refractory furnaces can be used to manufacture E7 at lower cost. The volume production of E7 glass fiber with large refractory furnaces makes it possible to meet the huge demand for high performance glass fiber from high end industries such as the wind energy industry. The excellent mechanical properties and volume production with refractory furnaces make E7 an optimal and cost-effective solution for the composites industry.

E7 - Reinforced wind blades are longer and more durable and reduce power generation cost

E7

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Fatigue test result based on UD1200 laminate:

Test conditions for fatigue resistance:

- Tested per ISO 13003:2003
- Laminates made [illegible]

E7 - Reinforced pultrusion materials have higher strength, stiffness and performance.

Pultrusion is a common production technology for producing glass fiber reinforced composites and features high production efficiency, high strength of finished products, low processing cost and consistent quality. It now has more and more applications including, for instance, pultruded sucker rods, FRP bridges and other construction profiles, which have longer service life, lower manufacturing cost and good corrosion [illegible]. With the expansion of the applications of [illegible] FRP products, customers are getting more demanding and require lighter and thinner pultruded FRP products which have higher strength, stiffness and fatigue resistance as well as good weatherability and corrosion resistance.

E7 glass fiber for pultrusion inherits the advantages of E7 glass and offers better strength, modulus and fatigue resistance, thus making [illegible] to manufacture [illegible] products, which are lighter and thinner with [illegible] strength, and have longer fatigue life and hence longer service life under the same stress. [illegible] E7 glass fiber has corrosion resistance equivalent with that of ECR glass [illegible] various environments, ensuring long-term stability in use of the pultruded final product.

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.

E7 Glass Fiber is produced by more scientific production technology and process which not only improve the product performances, but also significantly reduces air pollutants. The development of E7 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.

CUSTOMER AND TECHNICAL SUPPORT ORGANIZATION

Jushi Group possesses world class core technologies and advanced testing and analysis capabilities for glass, organic chemistry, glass fiber and composites. We have established a global network 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 E7 glass fiber reinforcements as well as our considerable knowledge of compounding and molding technology and processes.

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