

E7 Glass Fiber

Optimal Cost-Performance Solution for
High Performance Composite Materials



New High Performance 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 Scientific Workstation.

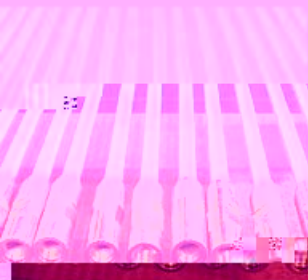


F7 New High Performance



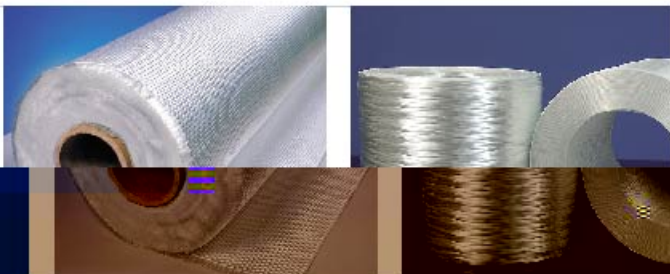
GOALS

Provide Optimal Cost-Performance Solution
for High Performance Geosynthetic Materials



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 traditional E glass;
- Higher softening point, 12% higher than traditional E glass.

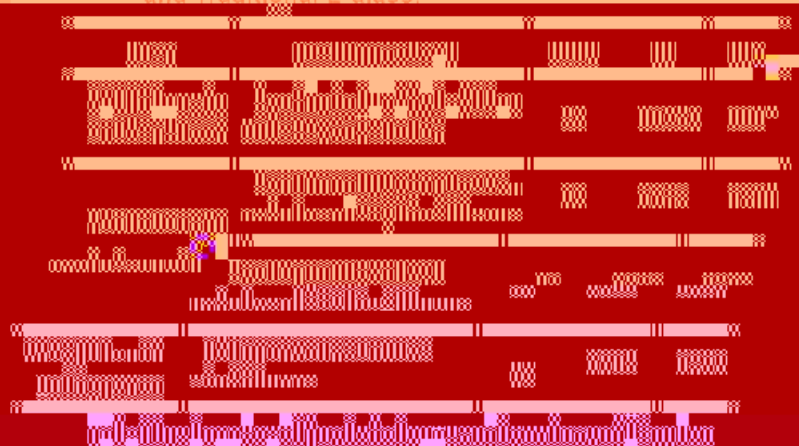
Therefore, E7 is suitable for use in composite materials which require higher mechanical properties.

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

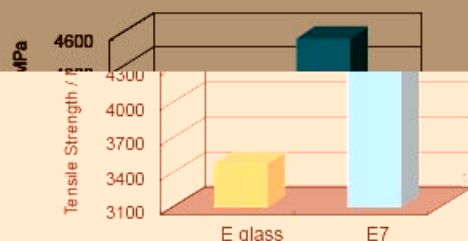
Property	Test method	Unit	E	E7
Density	ASTM C693	g/cm ³	2.60	2.60-2.61
Refractive Index	ASTM C1648	/	1.566	1.562
Expansion Coefficient	ASTM D696	10 ⁻⁶ K ⁻¹	6.1	5.5
Softening Point	ASTM C338	°C	838	921
Elastic Modulus	ASTM E1876	GPa	72	89
Dielectric Constant (23°C, 1MHz)	ASTM D150	/	6.7	7.0

E7 has a reasonable chemical composition which has not only obviously resistance than boron-free E glass fiber in neutral, acidic or alkaline solutions, ensuring long-term stable performance of E7-reinforced composites in special environments.

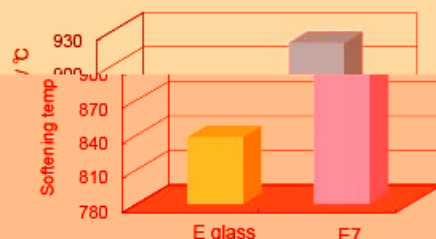
Corrosion Resistance Properties of E7 and Traditional E-glass:



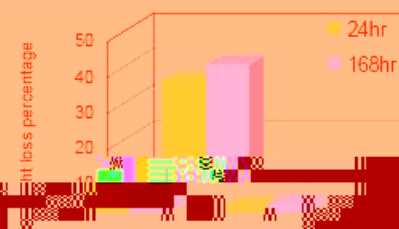
Comparison of Tensile Strength between E7 and E glass Fiber:



Comparison of Softening Point between E7 and E glass Fiber:



Comparison of Weight Loss in 10% H₂SO₄ at 96°C after 24 and 168 hours between E7 and E glass fiber:



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 large 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 cost-performance solution for the composites industry.

E7 reinforcement with ultra-high modulus and high strength can reduce power generation cost

extensively. The generation cost of wind power depends very much on the length of wind blades - longer blades lead to higher power generation efficiency. Longer blades require glass fiber reinforcements with higher strength and modulus since the use of carbon fiber in this industry is restricted due to its high price.

The fact that E7 can be volume produced with refractory furnaces makes it possible to meet the demand of the wind energy industry for a large quantity of high strength and high modulus glass fiber. By using E7, the manufacturers can make lighter, longer and more durable wind blades, which will lead to lower power generation cost in the end.

Take for instance Jushi UD1200 fabric which is widely used in spar caps of windmill blades. Compared with the boron free E glass based 398, the E7 based 380 products have a 30% increase in tensile strength, 11% increase in tensile modulus and significant increase in shear and compressive properties. Meanwhile, the fatigue resistance test shows that UD1200 laminates made from E7 based 380 has a 15% longer life time (in Log cycles) than boron free E glass based 398 under the same load.

Test Sample	Property	Standard	E	E6®	E7
Tensile property of impregnated roving, Epoxy resin	Tensile strength (MPa)	ASTM D2343	1900~2000	2500~2700	2800~3000
	Tensile modulus (MPa)	ASTM D2343	73~75	81~83	89~91
1200 g/m ² UD fabric, (tested in 0° direction), Infusion process, Epoxy resin	Tensile strength (MPa)	ISO 527-5	/	1120.6	1309.8
	Tensile modulus (MPa)	ISO 527-5	/	42.6	47.9
	Fiber Volume Content (%)	ISO 1172	/	53.6	53.9
	Tensile strength (MPa)	ISO 14126	/	805.5	900.5
	ensile modulus (GPa)	ISO 14126	/	42.9	48.2
	Fiber Volume Content (%)	ISO 1172	/	54.3	53.5

E7

New High Performance Glass Fiber



Fatigue test result based on UD1200 laminate:



Test conditions for fatigue resistance:

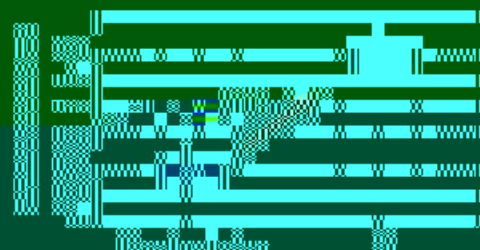
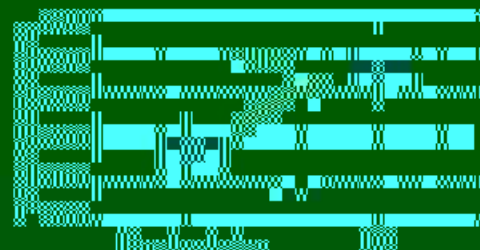
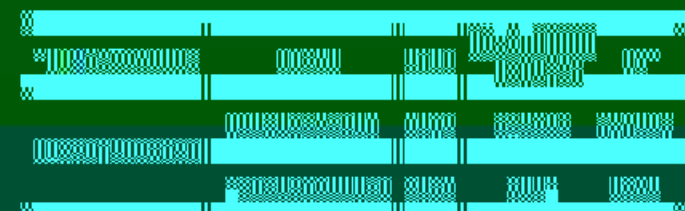
- Tested per ISO 13003:2003
- Laminates made with E7 glass

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 rubber rods, FRP bridges and other construction profiles, which have longer service life, lower manufacturing cost and good corrosion resistance.

With the expansion of the applications of 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 higher strength, stiffness and fatigue resistance, thus making E7 glass suitable in manufacturing even thinner and lighter FRP products, which are better and thinner with 60% weight reduction.



ENVIRONMENTAL PROTECTION

Become A Model for Clean Production

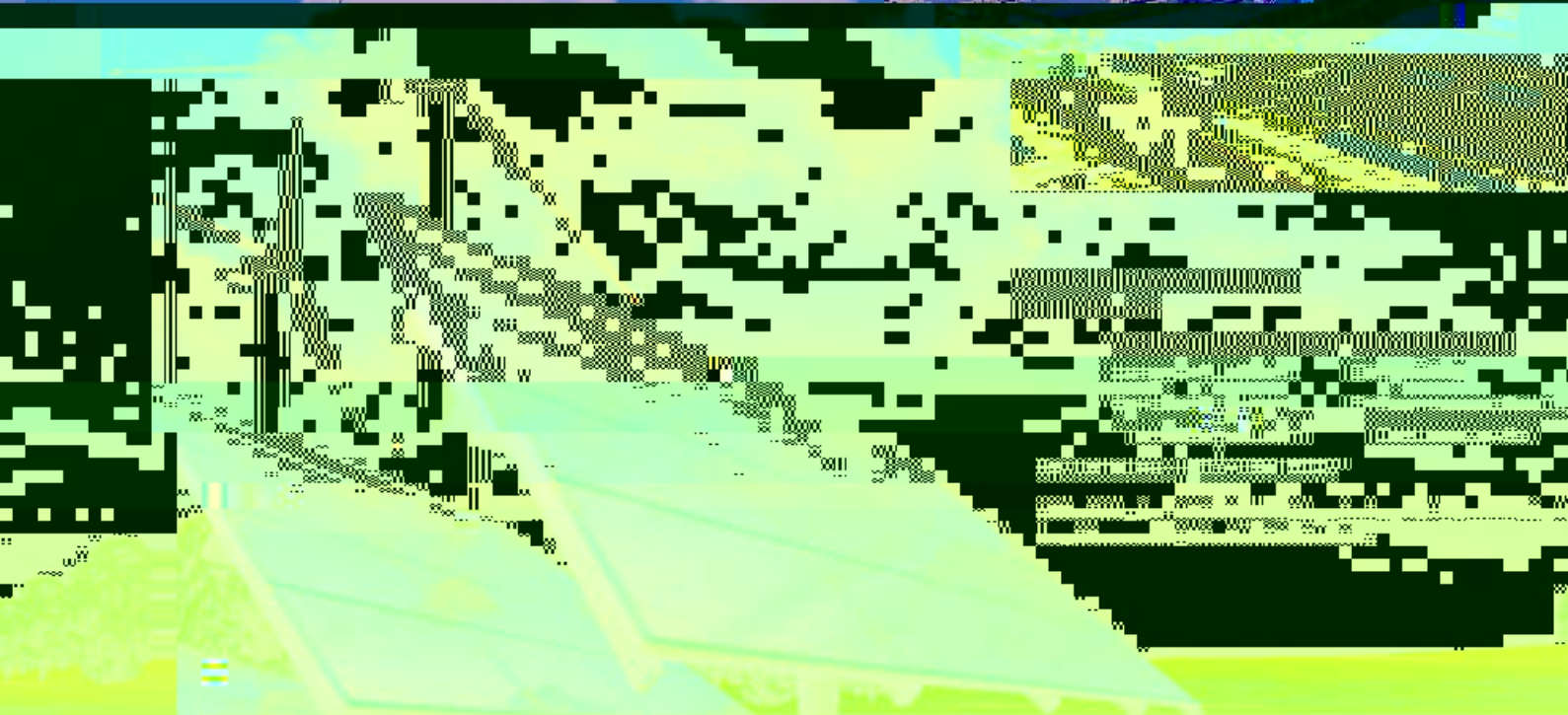
Jushi Group is committed to improving our environmental footprint. We have invested heavily in the most modern technologies available to reduce pollutant emissions into our environment. Improved oxygen firing technology reduced total waste gas emissions from the furnace by 81.2% and the nitrogen oxide 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.





Add: Tongxiang Economic Development Zone, Zhejiang 314500, China
International Sales: Tel: +86-573-88136318 Fax: +86-573-88181058
Domestic Sales: Tel: +86-573-88181016 Fax: +86-573-88136319
Customer Service: Tel: +86-573-88136325 Fax: +86-573-88136248
[Http://www.jushi.com](http://www.jushi.com) E-mail: info@jushi.com