



HEALFIBER GRAPHENE



Shandong Shengquan New Materials Co.,Ltd.
Add : Shengquan Industrial Park, Zhangqiu, Jinan, China
Web : www.shengquan.com
Tel : 400-512e

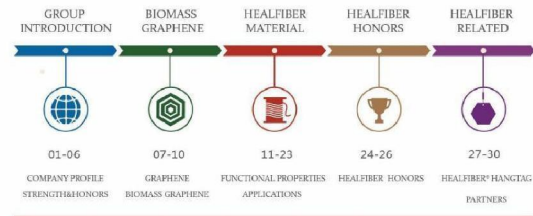
BIO - GRAPHENE HEALFIBER MATERIAL

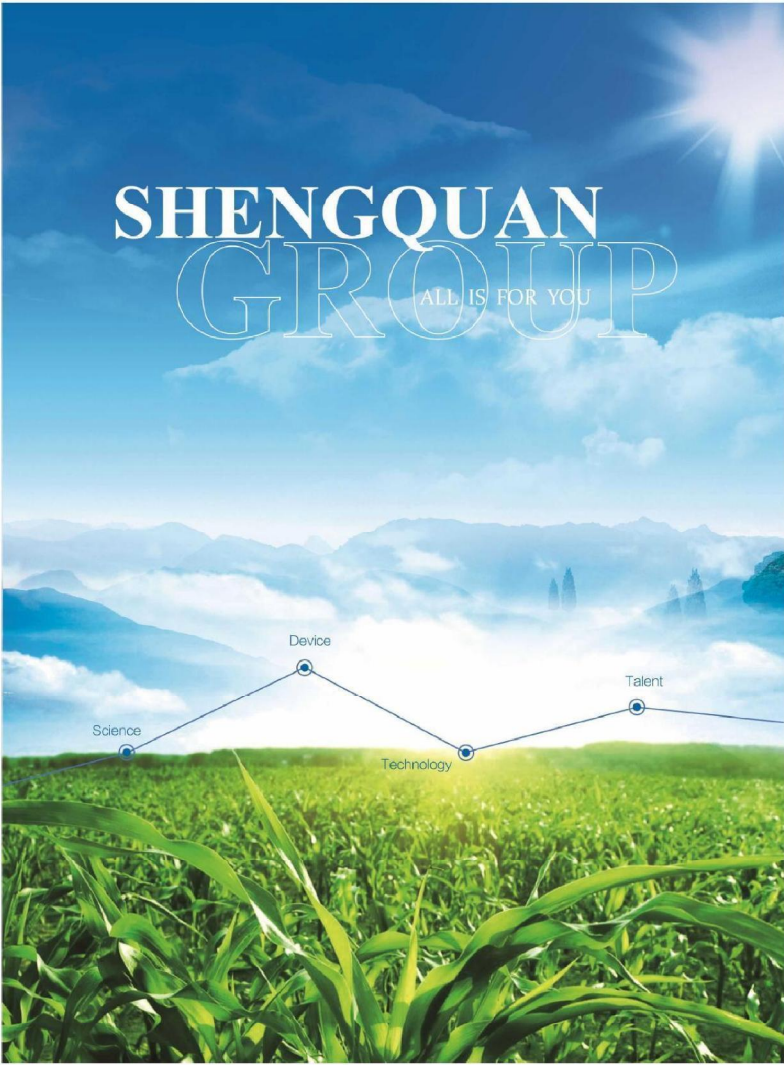
Healfiber®

Healfiber-An initial brand of global bio-graphene material



**HEALFIBER ,
DO GOOD TO YOUR BODY**





GROUP PROFILE



GROUP.

Company introduction



SHENGQUAN
— GLOBAL LEADER IN BIOMASS GRAPHENE



SQ is a high-tech enterprise which focuses on comprehensive utilization of biomass and new composite materials, one of the leaders of the global biomass industry. SQ is the world's largest foundry-material supplier and is the largest phenolic resin supplier in Asia. SQ provides insulation materials for the Shenzhou spacecraft returning capsule. SQ is recognized as National Technology Innovation Enterprise by Ministry of Industry and Information Technology of the People's Republic of China. Our goal at SQ is to become a world leader in graphene. SQ uses Biomass Graphene to make Healfiber® which combined with other materials can significantly affect the textile industry.



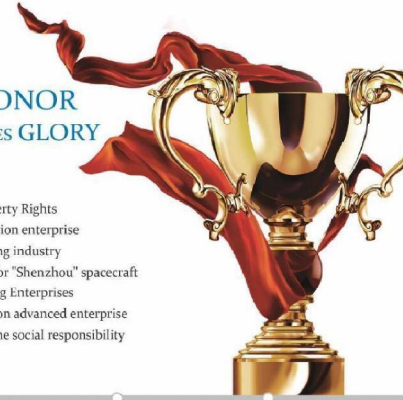
GROUP.

Strength & Honors



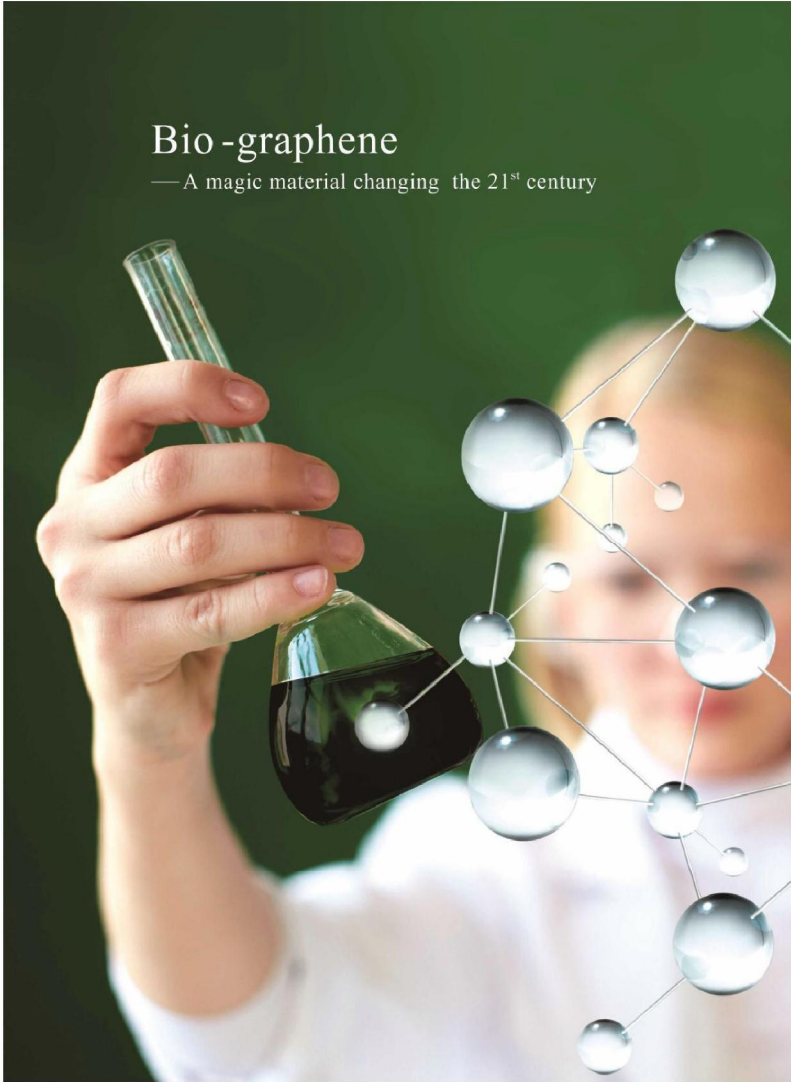
STRENGTH WITNESSES HONOR QUALITY FORGES GLORY

- National Key High-tech enterprise
- National Experiment unit of Intellectual Property Rights
- National technological innovation demonstration enterprise
- China's top-500 privately-owned manufacturing industry
- Manufacturer of thermal insulation material for "Shenzhou" spacecraft
- National Agricultural Industrialization Leading Enterprises
- Shandong Resources Comprehensive Utilization advanced enterprise
- China's industry five-star enterprise to fulfill the social responsibility
- National green plant



Bio-graphene

— A magic material changing the 21st century

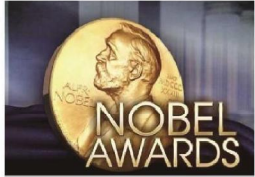


BIO -GRAPHENE

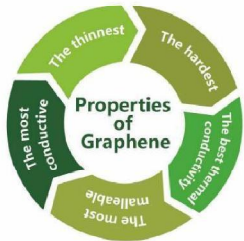


GRAPHENE.

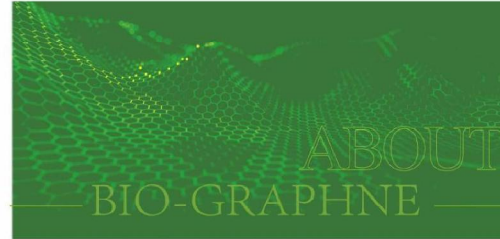
Graphene-the king of new materials



Graphene is among the thinnest and hardest nano materials and has very high electrical and thermal conductivity. Graphene has been hailed as "the miracle material" and has attracted world-wide attention since first prepared by Professors Andre Geim and Konstantin Novoselov in 2004, for which they jointly received the Nobel Prize for Physics in 2010.



- The Strongest Strength material in the world, harder than diamond and 100 times more powerful than the steel.
- The most conductive material in the world, electron velocity is about 1/300 of light speed.
- The thinnest material in the world, the thickness of one-layer graphene is 1/200000 of hair.
- The best thermal conductivity material in the world, thermal conductivity is up to 5300W/Md-K.
- The world's most malleable material, which can be stretched as much as 20% of their own size.

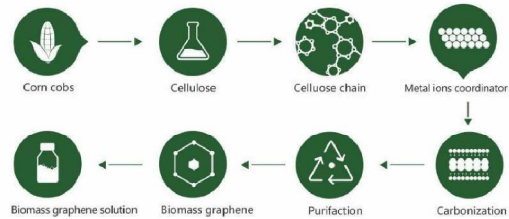


Shengquan Group achieves comprehensive utilization of biomass materials, such as hemi-cellulose, cellulose, and lignin through constantly innovating. By cooperating with Heilongjiang university, Chinese Academy of Sciences and Qingdao University, after 7 years of research, SQ successfully developed biomass graphene and built the world's first industrial production line of graphene.

Biomass graphene uses core cob cellulose as a raw material and is produced by a special process called GCA (Patent No.: ZL 2015 1 0096254.2), when incorporated into clothing, far-infrared function can be activated by the body's temperature, in addition to providing anti-bacterial, UV-absorption and anti-static properties.

There is no strong oxidation and chemical reduction process in biomass graphene production process, not only avoid the environmental pollution and environmental control as well as reach the green ecological manufacturing, and there is no chemical residues in products, greatly improve the biological safety of product use.

GCA : Group coordination assembly





HEALFIBER



BIO - GRAPHENE
HEALFIBER

HEALFIBER.

Healfiber Functional properties

Biomass Graphene--Healfiber material is a multi-functional intelligent modified material exclusively developed by Shengquan Group. It not only inherits characters of normal textile material, but also is endowed by biomass graphene with extre properties, which is provided a brand new view for people's healthy life.

1 Far infrared

Far-infrared rays of 4~16μm wavelength possess identical vibration frequency compared to water molecules in human cells. When such rays radiate on human bodies, resonance occurs with water molecules in human cells, Human surface cells will be activated, and microcirculation of human subcutaneous tissue will be accelerated producing warmth, promoting health, and improving immunity.



Detecting instrument: Laser Doppler Flowmeter

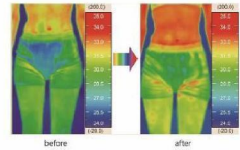
A laser Doppler flowmetry was utilized in the measurement of blood flow.

Experimental procedure:

Maintain the room temperature about 28 °C. Testee sits for 30 minutes after enter the testing room in order to adjust the breathe. Firstly, put the contrast sample (same ingredient, same Weight, black fabric without graphene) on the arm, collect data after 5 minutes, then take off the sample; secondly, put the graphene fabric on the arm, repeat the above mentioned operation; thirdly, summary data and draw a conclusion.

Conclusion:

It follows that graphene fabric has a great influence on Improving the human microcirculation. Compared with the normal fabric, blood flow rate improved 141.34%, number of hemocytes increased 61.73%, velocity increased 50.07%, temperature increased 4.21%, that is 1.27 °C.



Items	Area 1 (normal fabric)	Area2 (graphene fabric)	Change of percentage (area1 to area2)
blood flow rate	7.67	18.50	141.34
number of hemocytes	23.91	38.68	61.73
velocity	33.77	50.67	50.07
temperature	30.16	31.43	4.21

2 Anti-bacterial

Biomass Graphene Healfiber material has the anti-bacterial function. According to the test of national authoritative testing institution, anti-bacterial rate of Healfiber products aiming at common germs reaches to 99%. And due to its preparation technology, functions of Healfiber products are permanent.

Sample: biomass graphene modified acrylic fibers report NO: KTH2470453

Items	Standard	franchise	Testing result	Judgement
Candida albicans (ATCC10231) (%)	≥60	/	99	qualified
Escherichia coli (8099) (%)	≥70	/	98	
Staphylococcus aureus (ATCC8538) (%)	≥70	/	99	

The results meet the requirements of GB/T29943-2008



Test Report No. NUSL1611025620TX Date: Nov 10, 2016 Page 3 of 4

TEST METHOD(S):
AATCC 100-2012 Antibacterial Finishes on Textile Material: Assessment of

TEST ORGANISMS:
Klebsiella pneumoniae ATCC 4352, *Escherichia coli* ATCC 8739, *Staphylococcus aureus* ATCC 6538

TEST RESULT(S):

Test organisms	Concentration of bacteria (cfu/mL)	The number of bacteria recovered from		%Reduction
		at "0H" contact time (cfu/sample)	at "24H" contact time (cfu/sample)	
<i>Staphylococcus aureus</i> ATCC 6538	1.2 × 10 ⁵	Sample	1.0 × 10 ²	<100
		Control sample	2.8 × 10 ⁵	
<i>Escherichia coli</i> ATCC 8739	1.3 × 10 ⁵	Sample	1.0 × 10 ²	>99.9%
		Control sample	1.1 × 10 ⁵	
<i>Klebsiella pneumoniae</i> ATCC 4352	1.4 × 10 ⁵	Sample	1.1 × 10 ²	<100
		Control sample	1.4 × 10 ⁵	

Remark: Test sample is 12 swatches of 4.8 cm diameter circular, 1 mL inoculum per trial. The sample has been sterilized in the autoclave before the testing. The control sample is 100% cotton, provided by SGS laboratory.

3 Moisture absorption

According to the test of national authoritative testing institution, Biomass Graphene Healfiber material has the moisture absorption function. It can absorb moisture and perspiration diffused by people rapidly, and maintain the skin dry and comfortable.

Report No. : KFE04161837

Test Item	Standard	franchise	Testing result	Judgement
evaporation rate (g/h)	≥0.18	/	0.2	Qualified
water vapour transmission rate (g/<math>cm^2 \cdot d>)	≥10000	/	11020	
Drip diffusion time (S)	≤3	/	0.0	
measure wicking height (mm)	≥100	/	118	
water absorption (%)	≥200	/	261.7	
The results meet the requirements of GB/T20944.3-2008				

4 Static electricity dissipation

According to the test of national authoritative testing institution, Biomass Graphene Healfiber material has the static electricity dissipation function. Because of the minimum of graphene surface resistivity, static charge can be leaked quickly in order to reduce the static charge

Report No. : CKTCW150617570 C3

Test Item	(Unit)	Result	Conclusion	Remark
Maximum static voltage	V	1326	A级	Before washing
Static voltage half-life	S	0.9		
The results meet the requirements of GB/T12703.1-2008				

5 UV absorption

According to the test of national authoritative testing institution, Biomass Graphene Healfiber material has the UV absorption function.

Report No. : KFE04152344

	Test item	Standard	franchise	Testing result	Judgement
Anti-ultraviolet property	T(UVA)AV (%)	<5	/	0.18	Qualified
	T(UVB)AV (%)	/	/	0.16	/
	UPF (/)	>40	/	>50	Qualified
	The results meet the requirements of GB/T 18830-2009				

6 Green Material

Biomass graphene takes corn core cellulose as raw material, and there is no chemical pollution through the whole productive process.



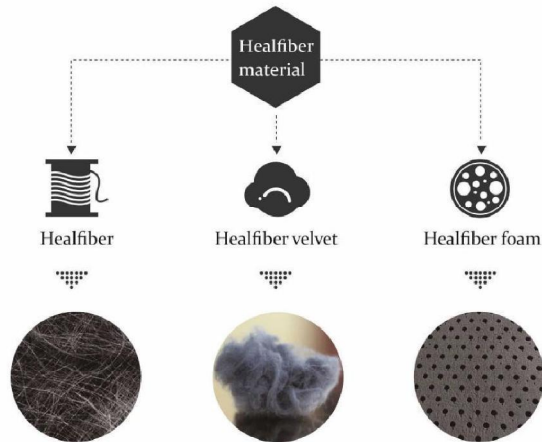
OEKO-TEX®
CONFIDENCE IN TEXTILES
STANDARD 100



HEALFIBER.

Healfiber Applications

Shengquan Group produced biomass graphene from corn cobs and successfully developed healfiber, healfiber velvet, healfiber foam etc series products into textile industry, which is the first one in the world.



III. HEALFIBER MATERIAL

Biomass Graphene Healfiber

Healfiber is a new multifunctional composite fiber material using biomass-based graphene with other fibers to provide desired properties of infrared protection, anti-bacterial activity, UV resistance, and static-electricity dissipation.

Healfiber has the potential of revolutionizing the global fiber industry.

Healfiber yarn sample :



■ Application of Healfiber products



ShengQuan conductive fiber

introduction

■ Definition

Graphene modified conductive fiber is made by dispersing uniformly biomass graphene into other fibers to acquire electrical conductivity property.

■ Features and advantages

- 1) Graphene modified conductive fiber has good performance in electrical conductivity (specific resistance $1*106\Omega\cdot\text{cm}$),anti-bacterial, far-infrared enhancement, microcirculation promotion, etc.
- 2) Graphene modified conductive fiber has good flexibility, spinnability and color dyeing and can realize the colorful (medium, dark) graphene modified conductive fiber mass production
- 3) The fabric/apparel made by graphene modified conductive fiber has high color fastness according to the third party inspection; after wash, soap, acid base sweat stains, dry friction, wet friction, the anti-static function still reach the quality standard of anti-static fabrics.



■ Future prospect

The specific apparel made by graphene conductive fiber will be widely used in gas station, oil refinery and other fields. By further optimizing the performance of the modified graphene conductive fiber, it is expected to be widely used in the field of intelligent wearable textile product

Predictably, graphene modified conductive fiber will be widely used in many fields, such as military industry, aerospace, intelligent sensor, intelligent wear,etc.

Biomass Graphene Healfiber® Velvet

Healfiber velvet is a new synthetic fiber, also called polyester composite fiber, that is making master batched of graphene uniformly dispersed in polyester chips. Healfiber velvet is very thin and soft, has good insulation, anti-static, and anti-bacterial properties, also exhibiting low far-infrared function. Healfiber velvet can be used to produce down jackets, sleeping bags, pillows and shawls. Healfiber is glossy and offers good thermal protection.

■ performance comparison



1 Healfiber velvet has good performance in anti-bacterial, while Duck down has bad one.

Duck down itself is a kind of protein fiber, which determines the poor anti-bacterial property. The appearance of healfiber velvet solves this concern.

Healfiber velvet is made by polyester with biomass graphene with good performance in anti-bacterial, the antibacterial rate can reach 99%, and achieve the national 3A standard of textile products.

2 Healfiber velvet can effectively prevent drilling down

Feather down can be easily drill from the clothes because of its own shape, especially in the cold and dry winter. The static electricity generated has a certain effect on the down. While healfiber velvet has velvet structure and anti-static function, it is hard to drill from clothes.

3 Healfiber velvet from the nature, odorless while down smelly

One of shortage of Down is that comes from animal and smells, some people when they touch animal hair or skins will have adverse reactions . Healfiber velvet comes from the natural and smells odorless as well as far-infrared and humidity-absorbing and breathable functions, no harm to the human body.

4 Continuous warming,air permeability is four times as much as down feather

One of shortage of Down is that comes from animal and smells, some people when they touch animal hair or skins will have adverse reactions . Healfiber velvet comes from the natural and smells odorless as well as far-infrared and humidity-absorbing and breathable functions, no harm to the human body.

5 After washing, properties of healfiber velvet are not reduced while down products deformation and performances will drop quickly

Healfiber velvet has good insulation, anti-static, and anti-bacterial properties, also exhibiting low far-infrared function; after many washing, the performance is not decaying as well as quick dry without deformation. While after washing, the feather down is easy to knead into a ball and become less warm.

■ Application of Healfiber velvet

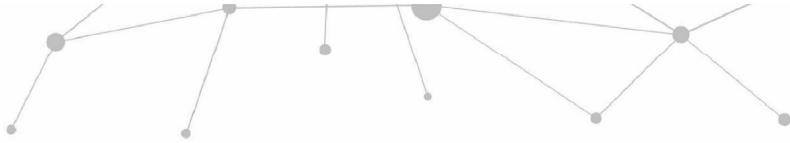


Biomass Graphene Healfiber® Memory Foam

Healfiber foam is made by uniformly disperse biomass graphene into natural latex or polyurethane materials through soft bubble preparation technology, including common soft bubble, slow rebound soft bubble, super soft bubble, high load soft bubble, high rebound soft bubble, etc. Healfiber foam can be prepared as seat cushion, neck pillow, waist pillow, u-pillow and other functional products

■ Application of Healfiber memory foam





Healfiber Innovation application



Medical and healthcare materials

Healfiber has its unique functions like far-infrared function, anti-bacterial function, moisture absorption and so on. It has a great influence on promoting blood circulation and removing obstruction in channels, activating cell tissue, relieving the pain of lesions and promoting wound repair.



Filter materials

Healfiber is able to provide with demandable non-woven filter system which is achievable to separate water and oil, solid and liquid, gas and liquid in submicron level. What's more, the non-woven composed with healfiber can effectively inhibit the growth of germs.



Flexible sensor materials

We will create Flexible plane super capacitance on Healfiber fabrics with the help of printing technology, which is going to achieve storage of electricity and transmission of signals on apparels. When you wear this kind of clothes, data of your blood pressure, heartbeat and body temperature is able to be measured by micro sensor in the clothes, and turned as electricity signal immediately to mobile devices, then formed your health file.



Automotive interior

Healfiber's smooth surface and elegant surface feeling make it suitable for luxury automotive interior materials. At the same time, its wear resistance, strength, and flame resistance are also very excellent properties for automotive interiors.



Health care materials

Tooth brush monofilament made by graphene modified nylon is able to inhibit the growth of germs firstly. Secondly, it can protect your gums because of its far-infrared function. Thirdly, due to its strong adsorption function, it can get rid of halitosis and prevent bacterial breeding. And graphene modified PBT hair can do much better on problems like the poor color of wig, bacterium breed because of badly ventilated, and frizziness owing to its bad antistatic ability.



HEALFIBER HONORS



HONORS.

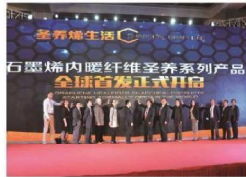
Healfiber Honors



July 2015, Healfiber passed the expert appraisal led by academican Yao mu on the appraisal and acceptance conference of Shengquan Group Biomass Graphene Healfiber and Application. According to the tests of national authoritative testing institutions, Healfiber has the functions like far infrared, anti-bacterial, moisture absorption, static electricity dissipation and UV absorbtion.



March 2016, 5.1.2e made a Graphene industry rapidly develop report to Premier Li Keqiang, and show him Healfiber products during the NPC.



October 2015, New product release conference of SQ biomass graphene Healfiber products made a great blockbuster on International Graphene conference.



September 2016, SQ biomass graphene Healfiber won "2016 Italy National science and technology innovation awards" honored by Italy Education, University and Research department. SQ is the first company getting this honor.

- March 2016, SQ Healfiber was chosen into Annual trends in Chinese fiber as Functional skin-friendly fiber.
- February 2017, biomass graphene products passed the American Food and Drug Administration authentication.
- December 2016, Healfiber passed the OEKO-TEX STANDARD 100 , product class I authentication.
- May 2017, far-infrared and anti-bacterial functions of Healfiber products passed China Health Care Association authentication.





HEALFIBER RELATED

HANGTAG.

Healfiber Hangtag

Healfiber is the trademark registered by Shengquan Group with its own intellectual property rights. Healfiber series products are made from biomass graphene achieved invention patent, leading the world level. As the main brand of the biomass graphene industry, Healfiber has gained market recognition under the company's publicity and promotion, and has been well received by consumers.



front



back

The function of Healfiber tag

- Healfiber tag is the only way for customers to identify the healfiber products. It is also a direct reflection of the value of the products. The hanging tag can be effectively recognized by customers and is conducive to product promotion and sales.
- High anti-counterfeiting, market controlling, safeguarding consumer rights, and safeguarded the legal rights and economic interests of the company and its partners.
- It is advantageous to integrate resources and promote the development of Healfiber brands, cooperate with each other and develop together to realize the mutual benefit of both sides.

Standard for tag use

All related products using biomass graphene products all must hang the tag. In order to maintain the rights and interests of Healfiber partners, ensure the use of the tag, and more effectively carry out the control of the hanging card, please apply for Healfiber tag and observe healfiber tag management system.

Security authentication

- New QR code anti-counterfeiting technology
- You can check the authenticity of goods by scraping the QR code or call 400 hotline on the tag;
 - Anti-counterfeit stickers is emblazoned with gray anti-counterfeiting background
 - The word adopts new anti-counterfeiting technology

PARTNERS.

Cooperation Partners



Devotion makes profession

Open · Tolerance · Cooperation · Win-Win
to build a development community of China graphene applicational industry



China Graphene
Modified Fiber and Application
Industry Development Union

CGFDU

5.1.2e

China Graphene Modified Fiber and Application Industry Development Union (CGFDU) is approved by Ministry of Industry and Information Technology of the People's Republic of China, in accordance with the spirit of letter from Ministry of Industry and Information Technology on supporting to prepare and establish Graphene Modified Fiber and Application Industry Development Union (MIIT original letter [2017] NO:277). CGFDU is a development community whose mission is to break through the industry chains of graphene that formed by graphene R&D enterprises, textile&apparel enterprises, high universities and institutes, under the principle of 'Open and Cooperation, Mutual Benefit and Win-Win'.

With the goal of to promote the innovative and model application in new products, new technologies, new formats and new schemata, CGFDU adopts 'one-stop services' pattern to build the industrial chain, to improve the innovative chain, to break the graphene limits and bottlenecks in modified fibers and other fields, to exert the leading role in promoting the innovation in organization, improving the standard specification, upgrading the industrial service capacity, coordinating and organizing the healthy development in this field, in order to promote the process of graphene industry development in China.

1. SQ led to set four group standards such as *Graphene Modified Chemical Fiber* (polyester fiber T/CCFA 01031-2017- viscose fiber 01032-2017- Acrylic fiber and tow 01033-2017- nylon 6 fiber 01034-2017)
2. SQ is involved in setting *Term, Definition and Code of Graphene Material* group standard (T/CGIA 001-2017) .
3. There are eight group standards like *Graphene Slurry Used in Fiber*, *Graphene Modified Polypropylene Fiber*, is being leading drafted by Shengquan Group.