品行 BEHAVIOR　创新 INNOVATION　责任 RESPONSIBILITY　学习 LEARNING　激情 ENTHUSIASM

浙江振石新材料股份有限公司
ZHEJIANG ZHENSHI NEW MATERIALS CO.,LTD.

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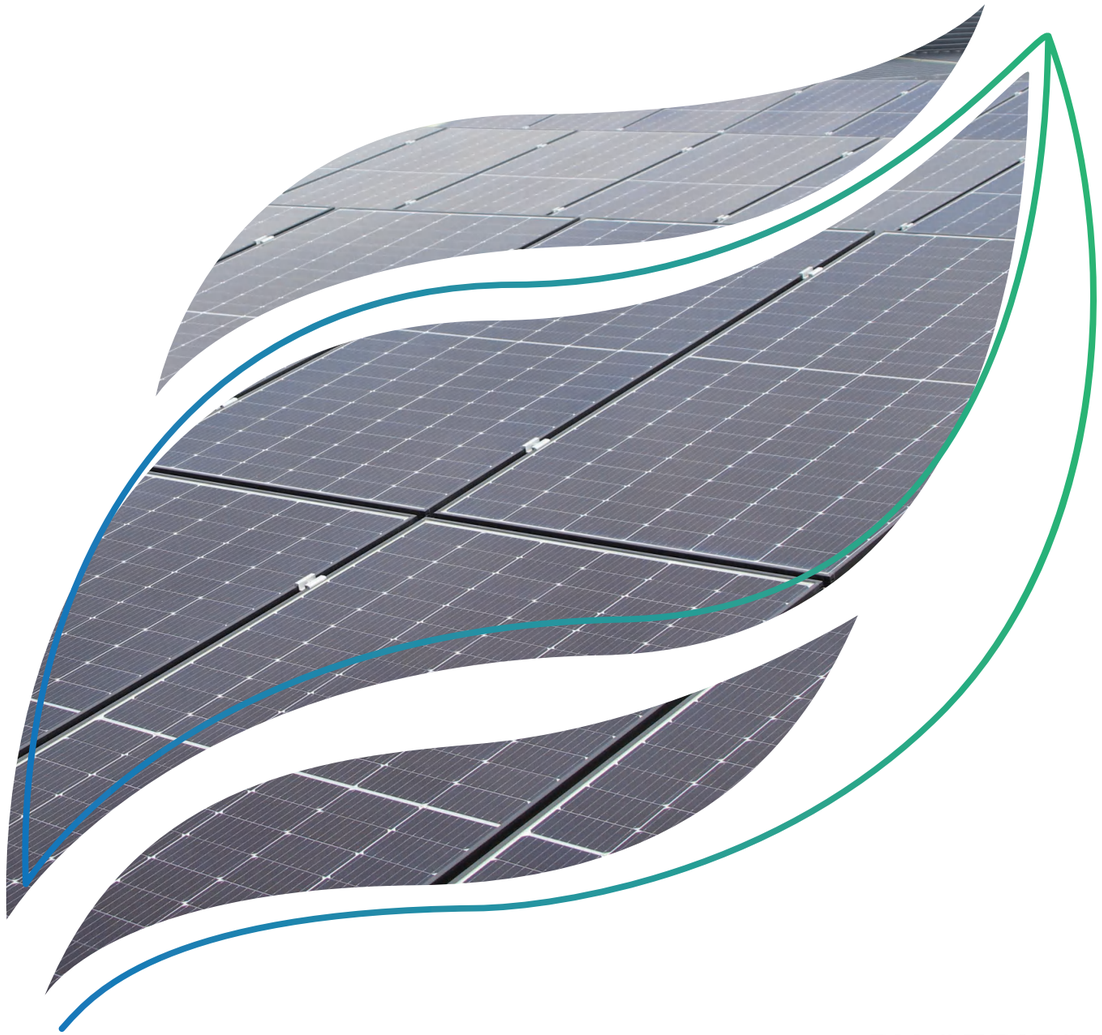
微信公众号
Wechat Public Account

振石股份
ZHENSHI CO.,LTD



PV SERIES

光伏系列

新材料 新领域 新高度 新贡献 新发展
NEW MATERIALS, NEW FIELDS, NEW HEIGHTS
NEW CONTRIBUTIONS AND NEW DEVELOPMENT

目 录 CONTENTS

企业简介 COMPANY PROFILE

浙江振石新材料股份有限公司(简称“振石股份”，股票代码：SH601112)，专业从事清洁能源领域高性能纤维增强复合材料研发、生产及销售的国家级高新技术企业。公司始于 2000 年，历经二十余年的创新发展，现已成为中国复合材料行业领军企业。公司深耕高性能纤维编织及热固、热塑性复合材料领域，产品广泛应用于新能源风电、太阳能光伏、新能源汽车等战略性新兴产业。

目前，公司拥有中国桐乡、埃及苏伊士、土耳其泰基尔达、西班牙加的斯等地 9 个生产基地，同时在美国洛杉矶和中国香港设有销售公司，可以快速响应全球客户的产品需求，产品远销 50 多个国家和地区。

Zhejiang Zhenshi New Materials Co., Ltd. (hereinafter referred to as “Zhenshi Co., Ltd.” ; Stock Code: SH601112) is a national high-tech enterprise specializing in the research and development, manufacturing and distribution of high-performance fiber-reinforced composite materials for the clean energy sector. Founded in 2000, the Company has emerged as a leading enterprise in China’ s composite materials industry following more than two decades of innovation. Specializing in high-performance fiber fabrics, thermosetting and thermoplastic composites,the Company supplies products widely used in strategic emerging industries such as wind power, solar photovoltaics and new energy vehicles.

Currently, the company has 9 production bases located in Tongxiang China, Suez Egypt, Tekirdag Turkey, and Cádiz Spain and it also has sales companies in Los Angeles, USA, and Hong Kong, China, which can quickly respond to the product needs of global customers. Its products are exported to more than 50 countries and regions.

愿景 Vision

保持与实现新材料行业的创新者与引领者

KEEP AND REALIZE THE INNOVATOR AND
LEADER OF NEW MATERIAL INDUSTRY

使命 Mission

新材料　新领域　新高度　新贡献　新发展

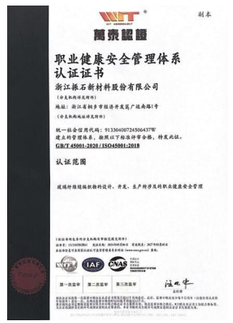
NEW MATERIALS, NEW FIELDS, NEW HEIGHTS
NEW CONTRIBUTIONS AND NEW DEVELOPMENT

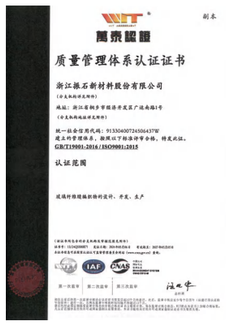
9个
生产基地
Production Bases

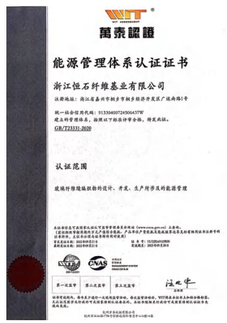
振石股份 ZHENSHI CO.,LTD

50+
国家
地区
Countries
and regions
产品远销
Sales Area

300+项
专利和认证
Patents and Certifications







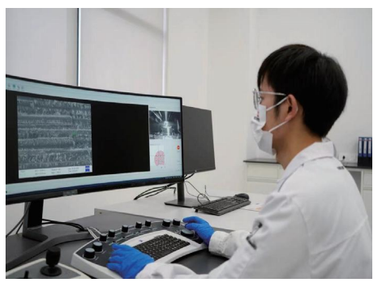
品质保证
QUALITY ASSURANCE

体系认证：公司先后通过了 ISO9001 质量管理体系、ISO14001 环境管理体系、ISO45001 职业健康安全管理体系、IATF16949 汽车质量管理体系、知识产权体系、ISO10012 测量管理体系认证以及 UL 产品认证、DNVGL 产品认证，为产品的品质提供了保障。

System Certification: The company has successfully obtained ISO9001 Quality Management System, ISO14001 Environmental Management System, ISO45001 Occupational Health and Safety Management System, IATF16949 Automotive Quality Management System , Intellectual Property System, ISO10012 Measurement Management System certifications, as wel l as UL product certification and DNVGL product certification, providing quality assurance for our products.

测试中心：成立于 2004 年，现拥有专业技术人员 50 余名，试验场地 5000 余平方米，各类仪器设备 150 余台套，进口设备占比 40% 以上。测试中心已通过中国合格评定国家认可委员会（CNAS）国家认可和全球风电行业权威认证机构 DNV ▪GL 认证。

The testing center was founded in 2004 and now has more than 50 professional and technical personnel, a test site of more than 5000 square meters, more than 150 sets of various instruments and equipments, and imported equipment accounts for more than 40%. The testing center has passed the national certification of China National Accreditation Service for Conformity Assessment (CNAS) and DNV ▪ GL certification, an authoritative certification agency in the global wind power industry.



测试内容达 60 余项，满足碳纤维、玻璃纤维及织物、纤维增强材料、光伏产品、汽车部件等领域的物理性能测试、静态力学测试、疲劳力学测试、化学分析测试、微观结构分析等，测试方法采用国际 ISO 或 ASTM 标准。

The testing contents covers more than 60 items, meeting the physical performance testing, static mechanical testing, fatigue mechanical testing, chemical analysis testing, and microstructure analysis, etc., in the fields of carbon fiber, glass fiber and fabrics, fiber-reinforced materials, photovoltaic products, automotive components, etc. The testing methods adopt international ISO or ASTM standards.

PV PRODUCT SERIES
光伏系列产品

复材边框
Composite PV Frame

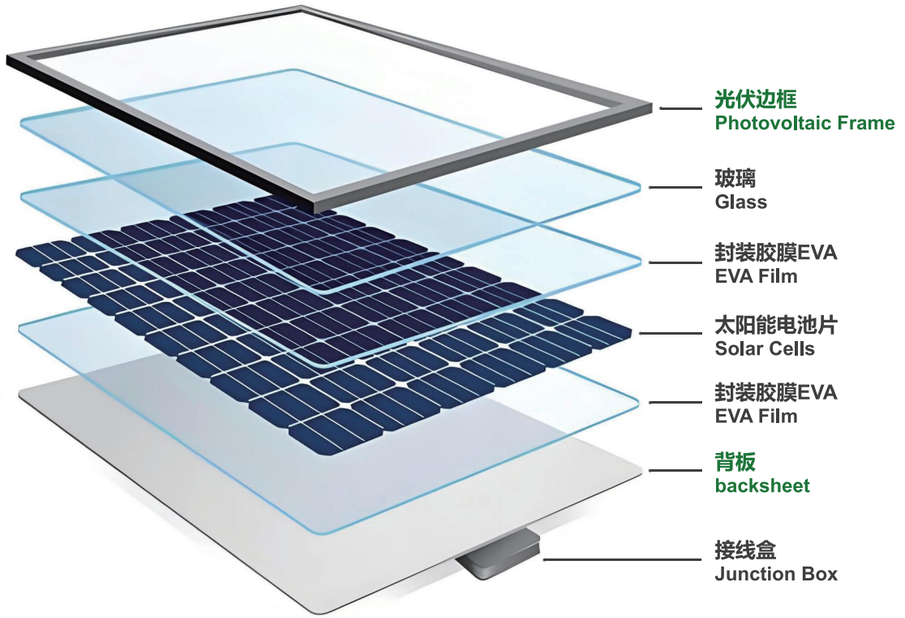
复材边框，具有轻质、高强、高模、低热膨胀系数、耐热冲击以及耐腐蚀等优异性能，在200℃以上保持良好的力学性能，因此可广泛应用于海面、沙漠、酸雨区等恶劣区域。

The composite PV frame is lightweight, high-strength, high-modulus, low thermal expansion coefficient, excellent heat resistance, and corrosion resistance. It maintains optimal mechanical properties even at temperatures exceeding 200℃, making it highly suitable for challenging environments such as marine areas, deserts, and acid rain areas.

复材背板
Composite PV Backsheet

复材背板，具有轻质、高强，抗造型强，柔韧性好和贴合度高等特点，可广泛应用于轻量化需求高的分布式组件，适用于安装场景承重有限的屋顶或幕墙等。

The composite backsheet features lightweight, high-strength, excellent shape resistance, good flexibility, and high conformity. It is widely used in distributed modules with high lightweight requirements, suitable for installation scenarios with limited load-bearing capacity, such as roofs or curtain walls.



太阳能电池板结构图
SCHEMATIC DIAGRAM OF SOLAR PANEL STRUCTURE

COMPOSITE PV FRAME
复材边框

产品信息/PRODUCT INFORMATION

浙江振石新材料股份有限公司全球首创的复材边框，相比传统铝合金和其他边框，具有使用寿命长、机械性能、耐盐雾、耐腐蚀性能更优越；绝缘性能和热学性能更好、绿色环保等优点。

该产品已通过 TÜV 认证，荣获莱茵全球首张复合新材光伏边框质量认证证书。

The composite PV frame, developed by Zhejiang Zhenshi New Materials Co., Ltd. has a longer shelf life, superior mechanical properties, enhanced resistance to salt spray and corrosion, improved insulation and thermal performance compared to traditional aluminum alloy frames and other alternatives. Additionally, it is environmentally friendly.

The product has obtained certification from TÜV Rheinland, making us the pioneering composite PV frame company to be awarded the world's first Rheinland quality certificate .

技术参数/TECHNICAL PARAMETERS

测试项目 Test Item	单位 Unit	铝边框 Aluminum Frame	复材边框 Composite PV Frame
机械性能 Mechanical Properties			
弯曲强度 Bending Strength	MPa	≥255	1400
拉伸强度 Tensile Strength	MPa	≥215	1400
巴氏硬度 Barcol Hardness	HBa	/	82
直线度 Straightness	mm/m	≤0.5	< 0.5
硅胶粘接力 Silicone Adhesive	N/cm	> 80	158
拉拔力 Drawing Force	N	≥200	1500
涂层耐磨 Wear-resistant Coating	L	> 200	＞2000
绝缘性能 Insulation Properties			
体积电阻率 Volume Resistivity	Ω·cm	$3*10^{-6}$	$1*10^{10}$
击穿电压 Breakdown Voltage	KV	/	28
热学性能 Thermal Properties			
温度指数 Temperature Index	℃	/	> 90
热变形温度 Heat Deflection Temperature	℃	/	> 220
老化性能 Aging Properties			
热湿测试 Moisture Resistance Test	/	/	涂层无脱落、剥离、纵向拉伸和弯曲剩余强度 > 600MPa。 The coating doesn't come off, peeling, longitudinal tensile and flexural residual strength > 600MPa.
耐热循环测试 Thermal Cycle Test	/	/	
耐湿冻测试 Wet and Freezing Resistance Test	/	/	涂层无脱落、剥离、纵向拉伸和弯曲剩余强度 > 800MPa。 The coating doesn't come off, peeling, longitudinal tensile and flexural residual strength > 800MPa.
耐紫外线测试 UV Resistance Test	/	/	
耐盐雾测试 Salt Spray Test	/	/	

8 大产品优势 Product Advantages

耐 候 Weather-resistance

边框材料通过 DH3000,TC600,HF30，DH2000+UV400 及盐雾 8 级测试，强度保持率大于 80%，可保证 25 年以上使用安全。

The frame material has passed DH3000,TC600,HF30, DH2000+UV400 and salt spray level 8 test, and the strength retention rate is greater than 80%, which can ensure the safety for more than 25 years.

耐 温 Heat Resistance

边框材料热变形温度超过230℃，热膨胀系数与玻璃一致，可降低玻璃爆裂风险。

The heat deformation temperature of the frame material exceeds 230 ℃, and the Coefficient of thermal expansion is consistent with the glass, which reduces the risk of glass bursting.

高 强 High Strength

边框的轴向强度是铝合金的5倍，在同等载荷作用下组件形变量更小，有利于保护电池片。

The axial strength of the frame is 5 times that of the aluminum alloy, and the deformation of modules is smaller under the same load, which is conducive to protecting the cells.

耐 腐 Corrosion Resistance

边框耐强酸、强碱、金属盐、工业清洁剂等各类化学试剂，适用于海上、滩涂、盐碱地、酸雨区等高腐蚀性区域。

The frame is resistant to strong acid, strong alkali, metal salt, industrial detergent and other chemical reagents, suitable for high corrosive areas such as sea, beach and saline-alkali areas.

耐 磨 Wear-resistant

边框采用落砂法磨穿表面需砂量2000L以上，耐磨强度是油漆涂层的10倍。

The wear resistance of Zhenshi composite frame is 10 times that of the paint coating. It requires more than 2000L abrasive to wear through the surface by flalling abrasive.

环 保 Environmental Protection

振石复材边框相比铝合金边框吨均碳排放量降低80%以上。

Compared with aluminum alloy frame, the carbon emission of zhenshi composite frame is reduced by more than 80% per ton.

绝 缘 Insulation

边框的体积电阻率为$1*10^{10}\Omega\cdot cm$，为电工级绝缘材料，组件可免接地。

The volume resistivity of the frame is $1 * 10^{10}\Omega \cdot cm$.

It is an electrical grade insulating material, so the modules can be free from grounding.

防爆裂 Anti-burst

边框材料弹性模量低于钢化玻璃，在高频风载作用下具有动载阻尼作用，不易形成共振，可有效缓解玻璃爆裂风险。

The elastic modulus of the frame material is lower than that of tempered glass, and it has dynamic load damping effect under high-frequency wind load, which is not easy to form resonance, and can effectively alleviate the risk of glass burst.

PRODUCT CERTIFICATES 产品证书

实证组件
安全运行证书
Empirical Module Security Operation Certificate

差异化应用耐候性“国品优选”检测证书 沙漠干热环境
Differentiated Application Weathering Resisitance “National Product Selection” Testing Certificate-desert Hot And Dry Environment

碳足迹认证证书
Carbon Footprint Certification

边框证书
PV Frame Certificate

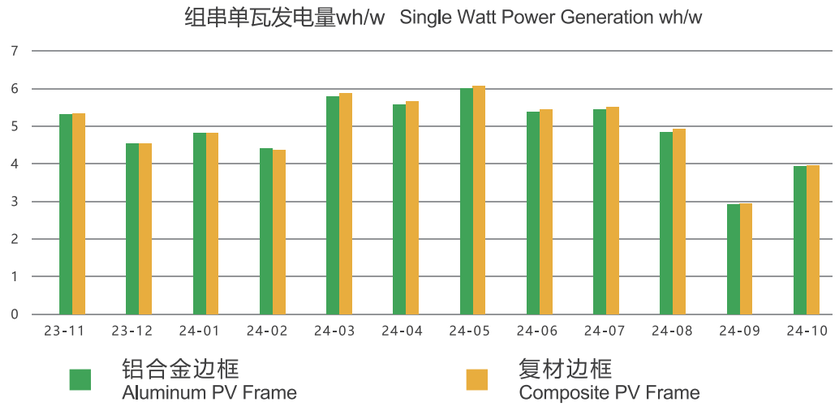
边框证书
PV Frame Certificate

组件证书
Module Certificate

实证发电量对比
Empirical Power Generation Comparison

复材边框
Composite PV Frame

铝合金边框
Aluminum PV Frame

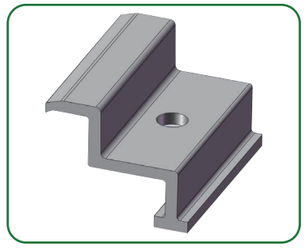
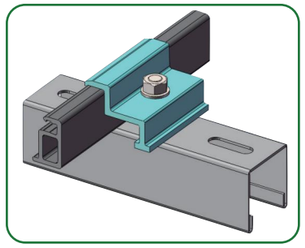


银川实证项目显示：搭配复材边框的光伏组件发电量与铝合金边框组件相当，充分证明了复材边框稳定可靠。

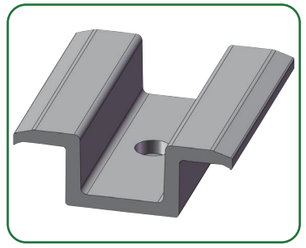
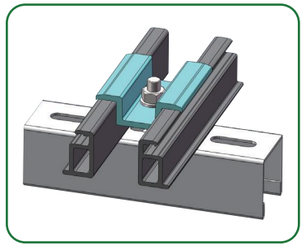
The Yinchuan Demonstration Project shows that photovoltaic modules with composite frame generate as much electricity as aluminum alloy, proving that composite frame are stable and reliable.

对比产品 Product comparison	异质结光伏组件搭配复材边框 Heterojunction PV module with composite frame	异质结光伏组件搭配铝边框 Heterojunction PV module with aluminum frame
异质结光伏组件 Heterojunction PV module	RHA66HDGDC-690	RHA66HDGDC-690
安装时间 Installation time	2023年10月-至今 October 2023 To Present	
项目地点 Project site	宁夏回族自治区银川市（38°34’57.77”N，106°0’55.72”E） Yinchuan, Ningxia Hui Autonomous Region（38°34’57.77”N，106°0’55.72”E）	
安装基准 Installation baseline	阵列倾角基准40°，方向正南 Array Inclination 40 °, Direction Due South	

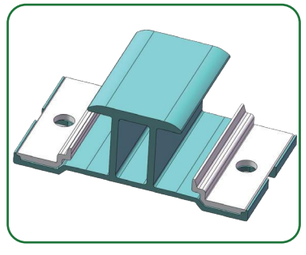
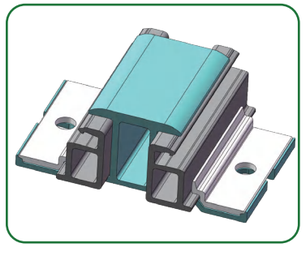
边框安装
Installtion

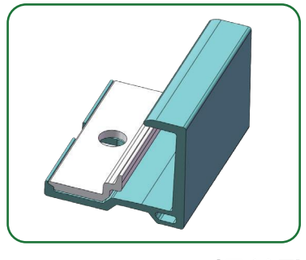
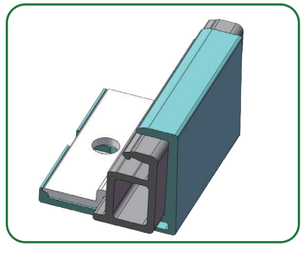
边压块 Side Block

中压块 Middle Block

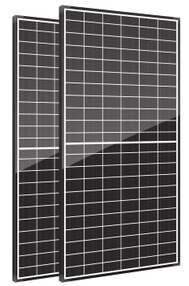



螺丝孔 Screw Hole

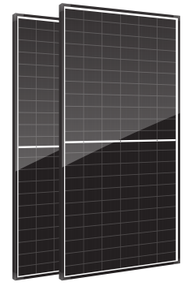



螺丝孔 Screw Hole

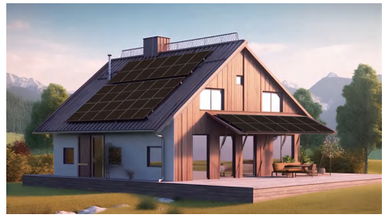
安装效果
Installation Effects



TOPcon组件
TOP CON MODULES

HJT组件
HJT MODULES

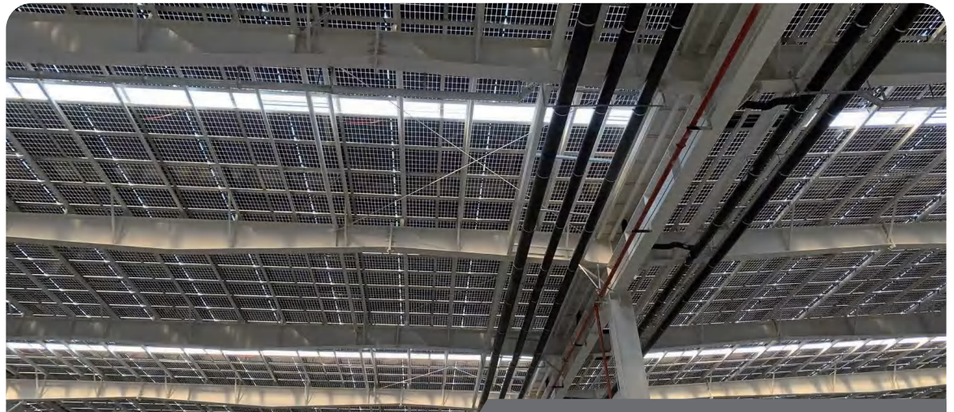


XBC组件
XBC MODULES

实证案例
Empirical Cases

环境：高紫外，风沙大
入驻时间：2023年10月
Environment: High UV radiation andheavy sandstorms
Entry Time: October 2023

湖面分布式
入驻时间：2024年5月
Distributed photovoltaic on the lake
Entry Time: May 2024



涟水屋面光伏(13MW)
BIPV建筑一体化
入驻时间：2024年4月
Lianyuan Rooftop Photovoltaic (13MW)
BIPV building integration
Entry Time: April 2024

环境：高盐雾，高湿度，风浪大
入驻时间：2023年10月
Environment：High salt spray，high humidity，strong wind and waves
Entry Time: October 2023

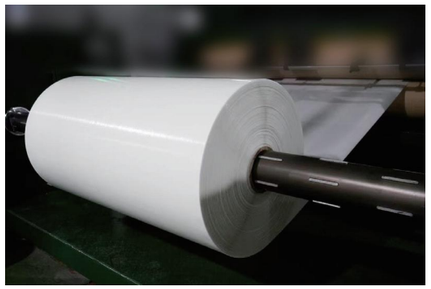
屋顶分布式（彩钢瓦安装）
入驻时间：2023年8月
Distributed photovotaic installed on colorsteel roof
Entry Time: August 2023

屋顶分布式（水泥屋面）
入驻时间：2023年3月
Distributed photovotaic installed on cement roof
Entry Time: March 2023

屋顶分布式
入驻时间：2023年11月
Distributed photovotaic
Entry Time: November 2023

COMPOSITE PV BACKSHEET
复材背板

产品图片/PRODUCT PICTURE



主要特点/CHARACTERISTICS

- 轻质 Light Weight
- 柔韧 Flexible
- 高强 High Strength
- 耐腐蚀 Corrosion Resistant

应用场景/APPLICATION SCENARIO

应用于柔性光伏组件和便携式光伏组件
Applicable to flexible photovoltaic modules and portable photovoltaic modules.

技术参数/TECHNICAL PARAMETERS

测试项目 Test Item	典型数值 Typical Values		
机械性能 Mechanical Properties	常温 Room Temperature	85℃ 85%RH，1000h	PCT48H
拉伸强度0° Tensile Strength 0°	323 MPa	306 MPa	313 MPa
拉伸模量0° Tensile Modulus 0°	17 GPa	17.6 GPa	18.2 GPa
断裂应变 Fracture Strain	1.9%	1.6%	1.9%
使用性能 Functional Performance			
热变形温度 HDT	161.2 ℃		
击穿电压 Breakdown Voltage	26.38 KV		
局部放电 Partial Discharge	1820 V		
体积电阻率 Volume Resistivity	$3.579*10^{13}$ Ω·m		
反射率（白色） Reflectivity (White)	≥ 50%（400 - 1100 nm）		
水蒸气透过率（红外传感器法） Water Vapor Transmission (Infrared Sensor Method)	≤1.0g/(M^2·d)(38℃，90%RH)		
POE胶膜粘结性 POE Film Adhesion	常温Room Temperature 91N/cm PCT24H 43 N/cm		
湿漏电（水温22±2℃，电阻率≤3500Ω/cm） Wet Leakage (Water Temperature 22±2°C, Resistivity ≤3500Ω/cm)	常温Room Temperature > 99 GΩ PCT24H 28 GΩ		
热老化性能(160℃ 6h) Thermal Aging Performance(160℃ 6h)	拉伸性能保持率>90% The tensile performance retention rate >90%		
抗紫外老化性能(200kW·h) UV Aging Resistance Performance(200kW·h)	拉伸性能保持率>90% The tensile performance retention rate >90%		

产品规格/PRODUCT SPECIFICATION

产品克重 Gram Weight	产品厚度 Thickness	产品颜色 Color	产品形态 Form	产品及切片幅宽 Width Option	成卷最大收卷重量 Maximum Roll Weight
870-930 gsm	0.6±0.1 mm	本色和黑色 Natural and Black	成卷和切片 Rolls and Sheets	50mm-2600 mm，可定制 50mm-2600 mm, customized	1570 kg
客户应用 Application					
表面涂装涂料，可适用辊涂和丝印工艺 The surface is coated with paint, suitable for both roll coating process and screen printing processes.				根据客户需求，提供功能性光伏背板，如V0阻燃等 We provide fumctional photovoltaic back panel according to customer requirements, such as V0 flame retardant.	

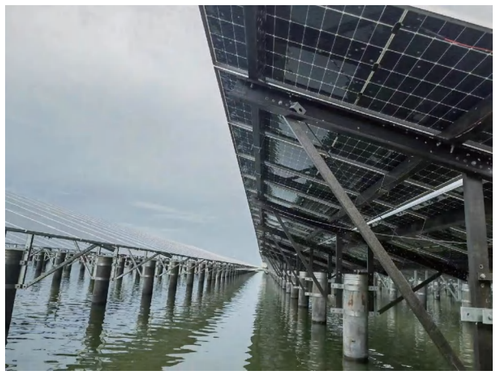
COMPOSITE SUPPORTING BRACKET
复材支架

产品图片/PRODUCT PICTURE

主要特点/CHARACTERISTICS

- 轻质 Light Weight
- 抗紫外线腐蚀 UV Corrosion Resistance
- 高强 High Strength
- 耐酸碱腐蚀 Acid and Alkali Corrosion

应用场景/APPLICATION SCENARIO



技术参数/TECHNICAL PARAMETERS

物性指标 Properties	典型数值 Typical Value
纤维含量 Fiber Volume Content (%)	75%
密度 Identity(G/cm^3)	2.1

物性指标 Properties	参考值 Value	测试标准 Test Standard
0° 拉伸模量 0° Tensile Modulus (GPa)	40	GB/T 1447-2005
0°拉伸强度 0°Tensile Strength (MPa)	800	GB/T 1447-2005
0°压缩强度 0°Compression Strength (MPa)	800	GB/T 1448-2005
0°压缩模量 0° Compression Modulus (GPa)	40	GB/T 1448-2005
0°弯曲模量 0°Flexural Modulus (MPa)	35	GB/T 9341-2008
0°弯曲强度 0°Flexural Strength (MPa)	800	GB/T 9341-2008
剪切强度 Shear Strength (MPa)	60	GB/T 1450
0°螺栓挤压强度 0°Bolt Extrusion Strength (MPa)	100	ASTM D5961
90° 螺栓挤压强度 90°Bolt Extrusion Strength (MPa)	180	ASTM D5961
螺钉拉拔承载力 Screw Drawing Capacity (KN)	5	ASTMD7332

注：典型数值受测试方法影响。

Note:Typical value is affect by the test methods.