SK斯威克®

太阳能电池封装胶膜
EVA FILM FOR SOLAR MODULE

产品手册
Product Manuals

常州斯威克光伏新材料有限公司
Changzhou Sveck PV New Material Co.,Ltd

企业文化
Enterprise Culture

企 业 使 命：做光伏行业的绿色供应商，持续为客户创造最大价值。

Enterprise Mission: To be a green supplier of photovoltaic industry and continuously create maximum value for customers.

企 业 愿 景：成为光伏新材料行业的引领者。

Enterprise Vision: To be the leader of photovoltaic new material industry.

核心价值观：人品、企品、产品三品合一。

Core values:Trinity of moral quality, corporate quality and.

企 业 宗 旨：为客户而想，为企业而强，为员工而富，为社会而存。

Corporate general aims: Think for customers, strive for corporate, earn for employees, exist for social well-being.

经 营 理 念：思进思变思发展，创新创业创一流。

Operate concept: Bear the progerss, reform and development into mind, Bring the innovation ,career and top-rating into reality.

SVK 斯威克®

公司简介 Company Profile

常州斯威克光伏新材料有限公司前身是2005年成立于深圳的深圳市斯威克科技有限公司，2010年整体搬迁至江苏省常州市金坛区（常州基地）,2020年底义乌基地投产。斯威克是一家从事新材料产业的创新型企业,占地面积约245亩，公司现有员工约1100人，已在运营的二个生产基地（常州和义乌），目前年产能已达到4.2亿平方米。

斯威克作为新材料行业的一体化解决方案的供应商，我们围绕客户的需求持续创新，与合作伙伴开方合作，并已发展为集研发、生产、销售于一体的综合性、创新性高新技术企业。斯威克经过十六年的深耕细作，在光伏封装材料领域和用于数码产品、新能源汽车及储能领域的电池软包封装材料分别取得了优秀的成果。我们的核心业务：抗PID EVA胶膜、白色EVA胶膜、纯PO胶膜、共挤PO胶膜、反光贴膜、铝塑膜等一系列产品。截止到2020年底，公司累计出货量达150GW。

斯威克一直不断追求卓越，技术创新，产品先后获得UL、TUV、VDE、CQC、JET、SGS等认证。公司多项产品和技术在相关领域获得了17项发明专利，90项实用新型专利和3项外观专利，另有99项发明专利在审。公司先后获得“江苏省民营科技企业、高新技术企业、两化融合贯标、市长质量奖”、“江苏省质量信用AA 级企业”、“常州市绿色工厂”等各项荣誉。公司研发中心先后获得“江苏省光伏组件封装材料工程技术研究中心”、“CNAS国家实验室”等称号。

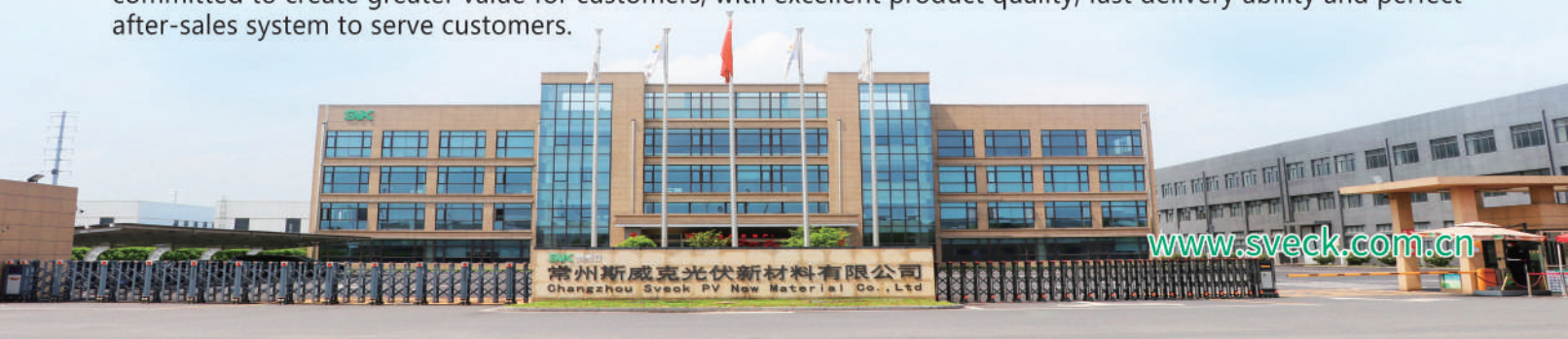
多年来，斯威克坚持走技术领先、质量为本的发展道路，以客户为中心，以服务提供价值。同时公司拥有一支由多名高级工程师和博士带领的专注的研发团队，拥有完善的科研设备和科学严谨的研发流程，建有江苏省博士后创新实践基地。斯威克致力于为客户创造更大的价值，以优异的产品品质，快速的交货能力和完善的售后体系服务好广大客户。

Changzhou Sveck Photovoltaic New Materials Co., Ltd., formerly Shenzhen Sveck Technology Co., Ltd., was founded in 2005 and moved to Jintan District, Changzhou City, Jiangsu Province in 2010 (Changzhou base), and Yiwu base was running into operation by the end of 2020. Sveck is an innovative enterprise engaged in the new material industry, covering an area of about 245 mu. The company has about 1100 employees, and has been operating two production bases (Changzhou and Yiwu). At present, the annual production capacity has reached 420 million square meters.

As a supplier of integrated solutions for the new material industry, Sveck has developed into a comprehensive and innovative high-tech enterprise integrating R & D, production and sales. After 16 years of intensive cultivation, Sveck has made outstanding achievements in the field of photovoltaic encapsulation materials and battery soft encapsulation materials used in digital products, new energy vehicles and energy storage. Our core business: Anti PID EVA film, White EVA film, PO film, Co- PO film, LRF film, Aluminum plastic film and a series of products. By the end of 2020, the company's total shipment volume has reached 150GW.

Sveck has been pursuing excellence and technological innovation. Its products have been certified by UL, TUV, VDE, CQC, JET and SGS. A number of products and technologies of the company have obtained 17 invention patents, 90 utility model patents and 3 appearance patents in related fields, and 99 invention patents are under trial. The company has won various honors such as "Jiangsu Province Private Science and Technology Enterprises, High-tech Enterprises, Integration of Informatization and Industrialization, Mayor Quality Award", "Jiangsu Province Quality Credit AA Grade Enterprise", "Changzhou Green Factory" and so on. The R & D center of the company has won the titles of "Jiangsu Photovoltaic Module Encapsulation Materials Engineering Technology Research Center" and "CNAS National Laboratory".

Over the years, Sveck adheres to the development path of leading technology and quality-oriented, customer-centric and service-oriented. At the same time, the company has a dedicated R & D team led by a number of senior engineers and doctors, with perfect scientific research equipment and scientific and rigorous R & D process, and has established a post-doctoral innovation practice base in Jiangsu Province. Sveck is committed to create greater value for customers, with excellent product quality, fast delivery ability and perfect after-sales system to serve customers.



超快固EVA SV-15296P & SV-15297P
Ultrafast Cure EVA Type SV-15296P & SV-15297P

产品介绍

SV-15296P和SV- 15297P是斯威克超快固交联型EVA,具有优异的抗PID、抗蜗牛纹性能;与常规抗PID EVA交联速度相比，层压时间更短，可以大幅度提升组件的生产效率。

Product Introduction

SV-15296P and SV-15297P are the ultrafast cure EVA, with excellent Anti-PIDAnti-Snail track. Compare to normal EVA, the lamination time of ultrafast cure type is shorter,which can improve module production efficiency grently.

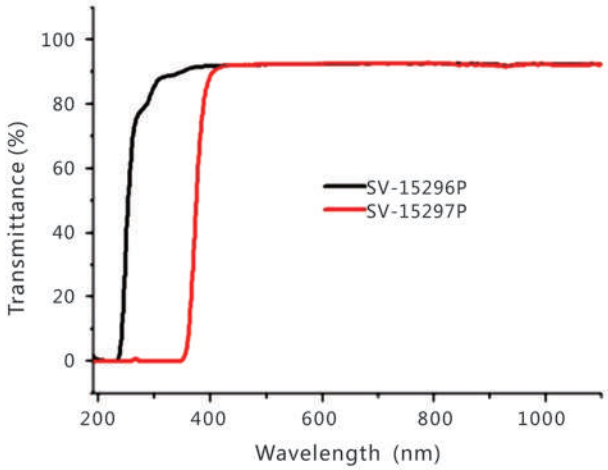
产品特点

1.高效的光学性能。
2.交联速度快,封装效率高。
3.优越的耐候性(包括高温、高湿、紫外等)。
4.优异的抗PID特性。
5.优异的抗蜗牛纹特性。

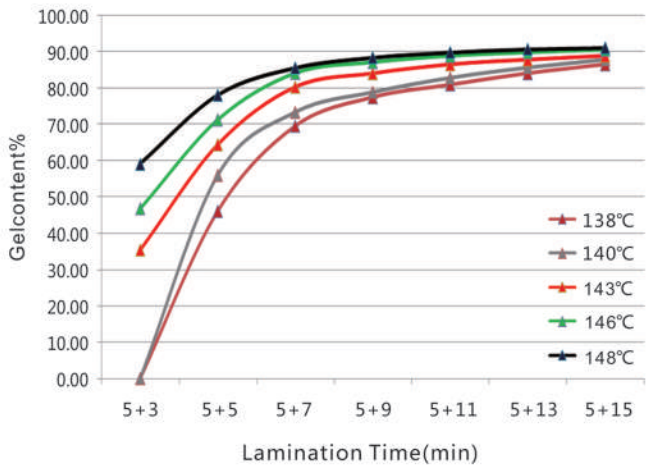
Product Characteristic

1. Excellent optical property.
2. Less lamination time,high encapsulation efficiency.
3. Excellent durability performance(Including high temperature/humidity resistance and UV test).
4. Excellent performance for Anti-PID.
5. Excellent performance for Anti- Snail track.

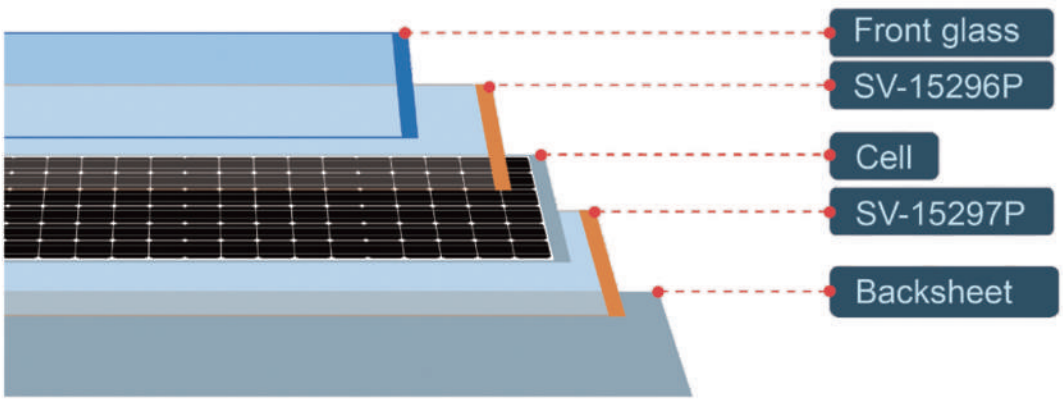
光学性能
Optical Property



快速交联特性
Fast Cure Type Crosslinking Property

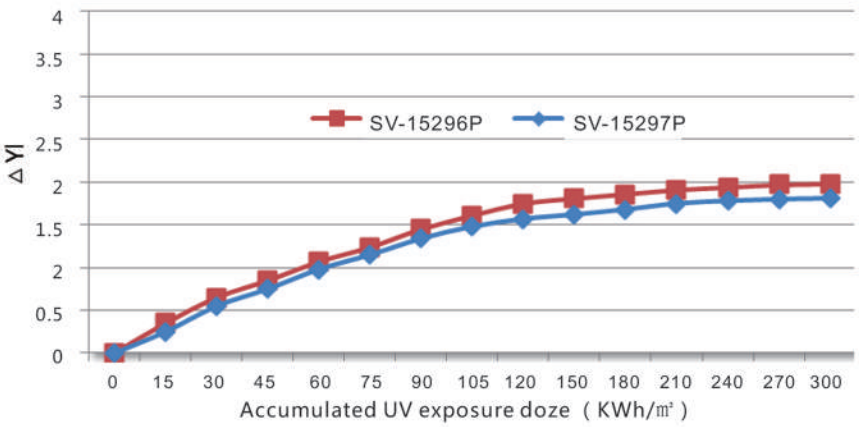


组件叠层结构 Solar Module Encapsulate Structure

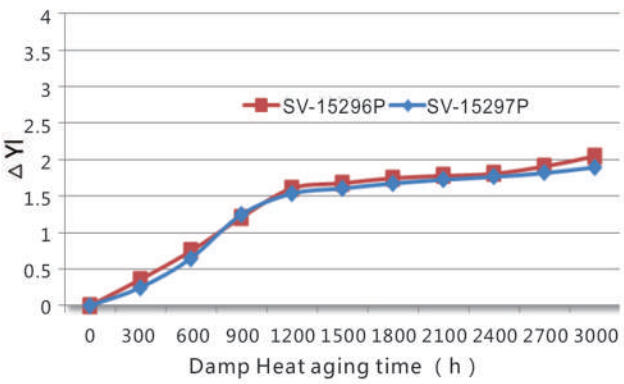


优异的耐候性能 Excellent Durability

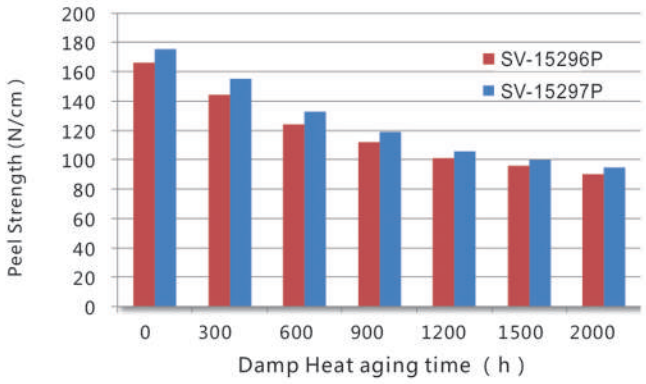
紫外老化黄变指数
Yellowness after UV aging Test



湿热老化黄变指数
Yellowness after DH Test



湿热老化黄变剥离强度
Peel Strength after DH Test



说明：

电位诱发衰减(PID)效应是光伏电站中的组件长期处于高系统电压下工作导致功率严重衰减的现象。Sveck抗PID系列封装材料可以有效地阻止可移动的钾钠离子迁移至电池片,能满足光伏组件通过85°C，RH85%, - 1500Vdc, 96h的PID测试,从而保证电站持续、稳定的安全运营。

Introduction:

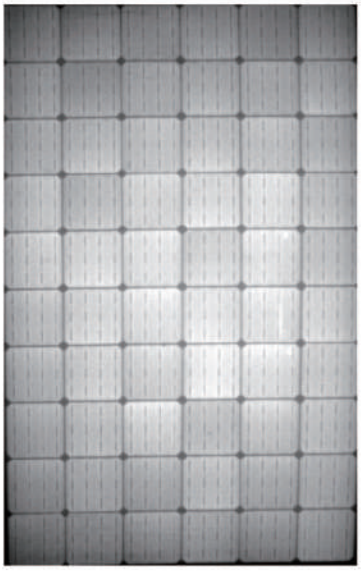
The Potential Induced Degradation (PID) is a phenomenon of solar modules work under high voltage for a long time, which may cause serious power loss. Anti-PID encapsulated material can effectively prevent the Na^+, K^+ moving to the cell.

不同抗PID EVA的PID性能的对比
PID Resistance Comparison

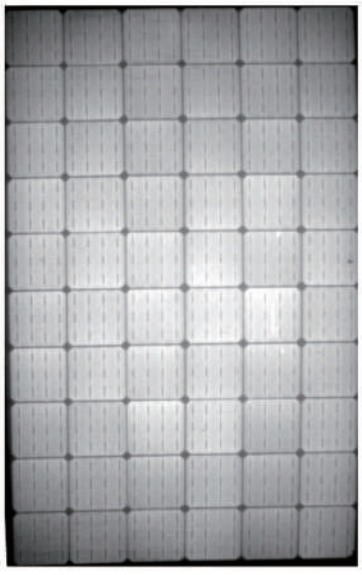
(Test condition: Temp: 85℃, RH85%, -1500Vdc.)

PID Free EVA	组件功率衰减数据 Solar Module Power Loss After PID Test	
	PID 96h	PID 480h
SV-15296P/SV-15297P	0.7%	2.3%
Anti-PID EVA—Company A	2.5%	4.7%
Anti-PID EVA—Company B	6.3%	9.4%
Anti-PID EVA—Company C	17.1%	30.1%
Anti-PID EVA—Company D	24.8%	48.6%

0hour



96hours



480hours

白色EVA胶膜SV-15297W
White EVA Film SV-15297W

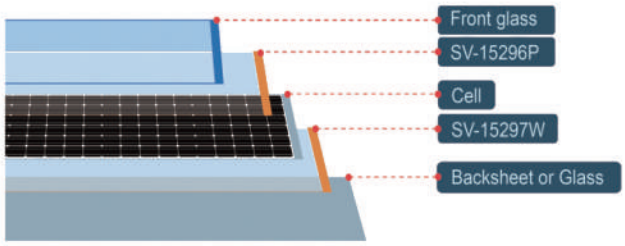
产品介绍

SV-15297W白色EVA胶膜是斯威克推出的一种新型封装材料,具有高反射的功能,可以有效地提升电池片对光线的利用。降低组件的封装损失;可应用于普通晶体硅太阳能组件、双玻组件和薄膜太阳能电池组件的封装。同时SV- 15297W封装后的组件不会出现胶膜溢白、褶皱、电池片隐裂等问题。

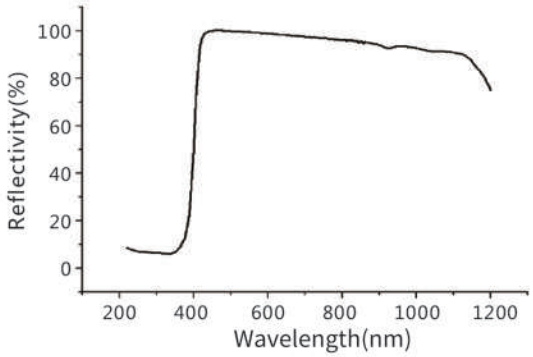
Product Introduction

SV-15297W White EVA film is new encapsulant promoted by sveck. It has high reflectivity, can effectively improve the utilization of the light of solar cell, reduce the module CTM loss. It can be used for normal crystalline silicon solar module, G to G solar module and thin film solar module . At the same time , the module using SV-15297W will not appear overflow, wrinkles and cell micro crack problems after lamination.

组件叠层结构图
Solar Module Encapsulate Structure

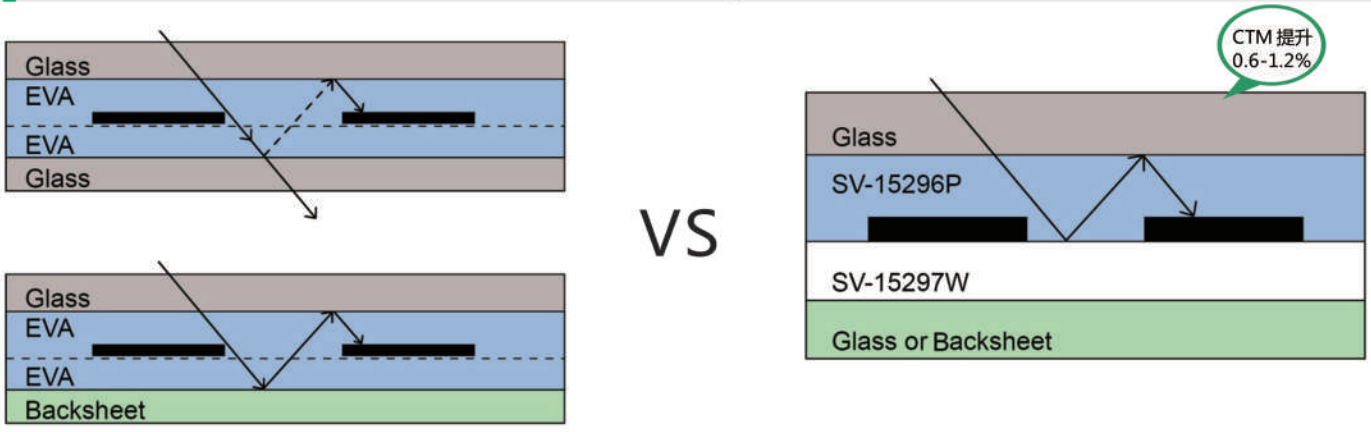


光学性能
Optical Property



Wavelength (nm)	280~380	400~700	380~1100
Reflectivity (%)	7.5	97.6	93.8

组件内部光线路径
Light Route of Inner Module



性能参数
Technical Date Sheet

性 能 Properties	项 目 Item	测试标准 Test Standard	单 位 Unit	SV-15296P	SV-15297P	SV-15297W
物理性能 Physical Properties	密度 Density	ASTM D792	g/cm^3	0.96		
	拉伸强度（固化后） Tensile Strength (After Lamination)	GB/T 13022-91	Mpa	≥16	≥16	≥16
	断裂伸长率（固化后） Ultimate Elongation (After Lamination)		%	550	550	550
	胶膜与玻璃的剥离强度 Peel Strength with Glass	ASTM D903	N/cm	>60		
	胶膜与背板的剥离强度 Peel Strength with Back Sheet		N/cm	>40		
热性能 Thermal Properties	收缩率 Shrinkage	ASTM 1204	MD%/TD%	<3/<1.5		
交联度Gel content		ASTM D2765	%	>75	>75	>75
电性能 Electrical Properties	体积电阻率 Volume Resistivity	GB 1410-89	Ω.cm	$\geq 1.0\times10^{15}$	$\geq 1.0\times10^{15}$	$\geq 1.0\times10^{14}$
光学性能 Optical Properties	紫外截止波长 UV cut off	Sveck standard	nm	–	360	–
	透光率 Light Transmission (280-380nm)	GB/2410-2008	%	>80	<10	–
	透光率 Light Transmission (380nm~1100nm)		%	≥92	≥92	–
	反射率 Reflectivity		%	–	–	>90
稳定性 Stability	紫外老化 UV Aging Yellowness	120KWh/m^2	ΔYI	<2		
	湿热老化 Heat/Humidity Yellowness	85℃、85%,2000h	ΔYI	<2		

快速交联PO胶膜SE-556 &SE-557
Fast Cure Type PO Film SE-556 &SE-557

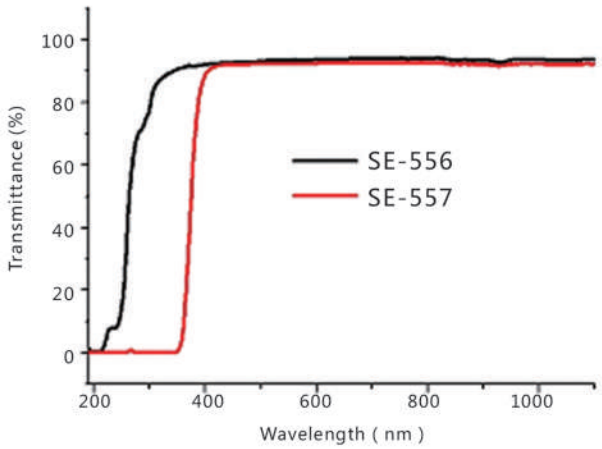
产品介绍

快速交联PO胶膜SE-556/SE-557是斯威克最新推出的快速交联型聚烯烃胶膜,能够实现快速固化,提高组件的生产效率。

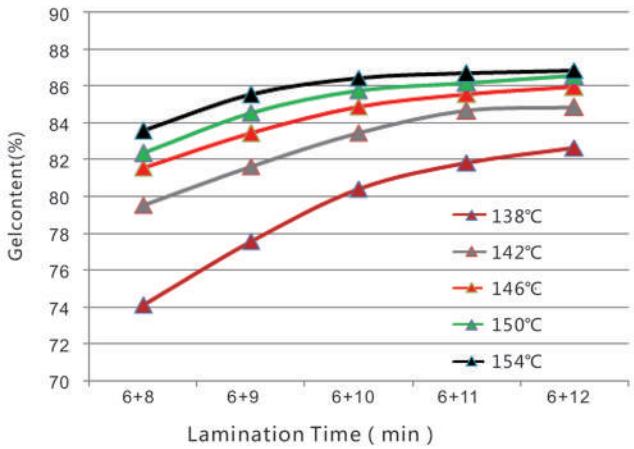
Product Introduction

SE-556/SE-557 are the newest fast cure type PO, which can shorten the lamination time and improve the production efficiency.

光学性能
Optical Property



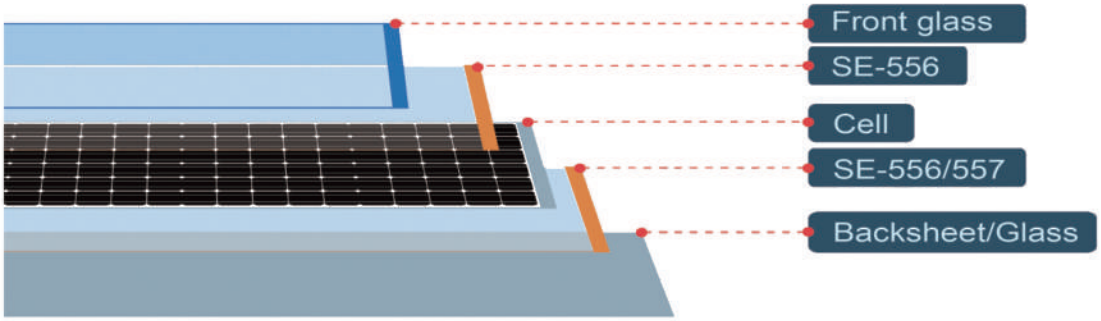
交联特性
Crosslinking Property



层压工艺
Lamination Recipe

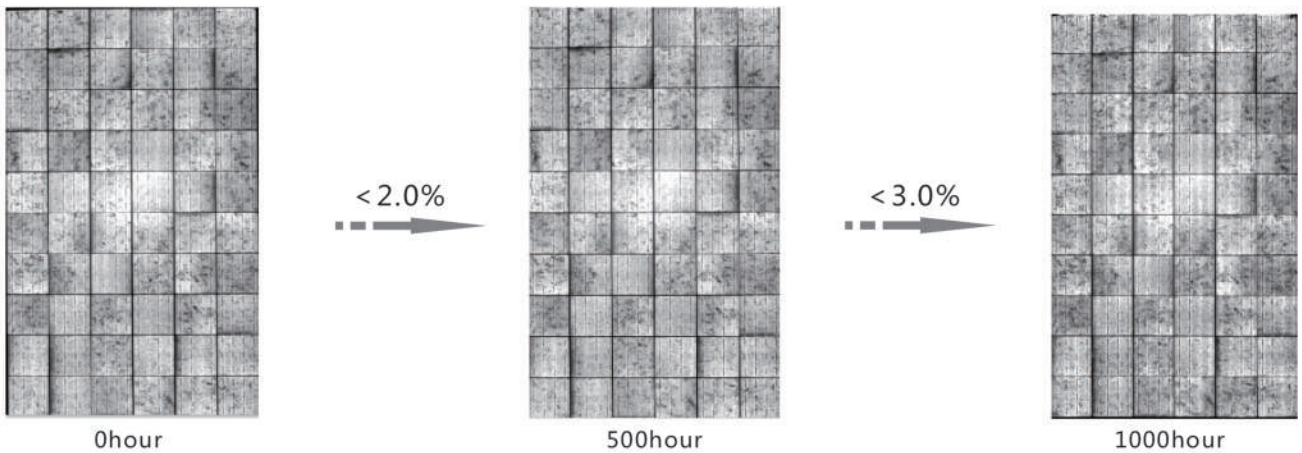
型号 Type	层压温度(℃) Lamination Temperature	抽真空时(min) Pumping Time	层压时间(min) Pressing Time
SE-556/SE-557	138~154	6-7	8-10

组件叠层结构
Solar Module Encapsulate Structure



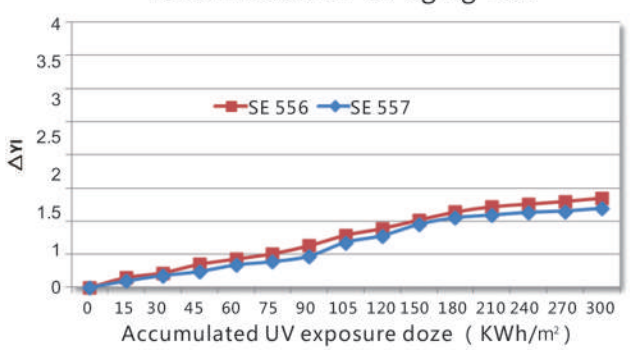
抗PID性能测试

(Test condition: Temp: 85℃, RH85%, -1000Vdc.)

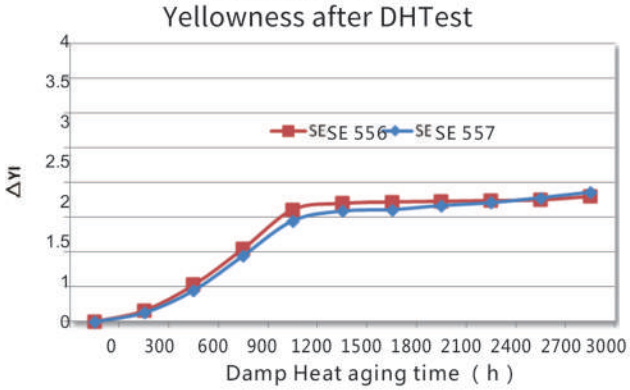


优异的耐候性能 Excellent Durability

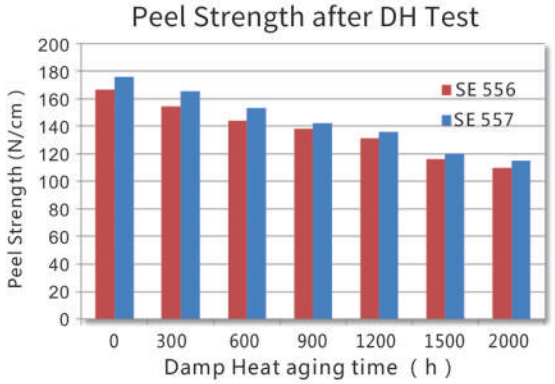
紫外老化黄变指数
Yellowness after UV aging Test



湿热老化黄变指数
Yellowness after DHTest



湿热老化黄变剥离强度
Peel Strength after DH Test



PO Ⅱ 胶膜 SE-556
Introduction of PO Ⅱ SE-556

产品介绍

PO Ⅱ 封装胶膜是为双面电池应运而生的新型PO胶膜，是PO和EVA 树脂通过共挤工艺而生产出来的封装胶膜，为EVA/PO/EVA三层结构。它不仅能满足PERC、N型双面电池的PID要求，而且能提升组件端的成品良率。

Product Introduction

PO Ⅱ film is a new type of PO encapsulation film for bifacial cells. It's produced by the process of PO and EVA resin, with a structure of EVA/PO/EVA three-layers. It can not only meet the PID requirements of PERC and N-type bifacial modules, but also improve the yield of finished products.

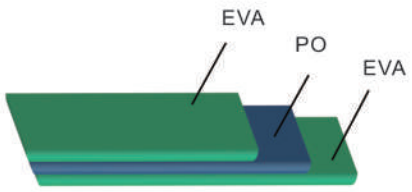
PO胶膜特点

1.PO Ⅱ 胶膜可满足P型及N型双面电池抗PID要求。
2.PO Ⅱ 胶膜层压工艺窗口更宽，组件制程良率高。
3.PO Ⅱ 胶膜组件端生产效率高，利于实现自动化。

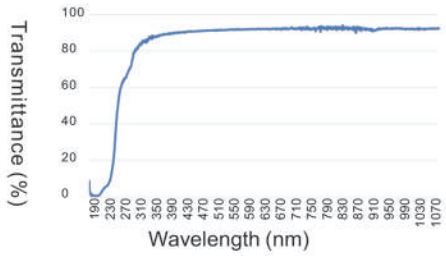
Characteristics

1. PO Ⅱ film can fully meet the anti-PID requirements of PERC and N-type bifacial modules.
2. PO Ⅱ has the lamination characteristic of EVA, and the module lamination yield is high.
3. PO Ⅱ has the higher production efficiency,and automation can be easily achieved.

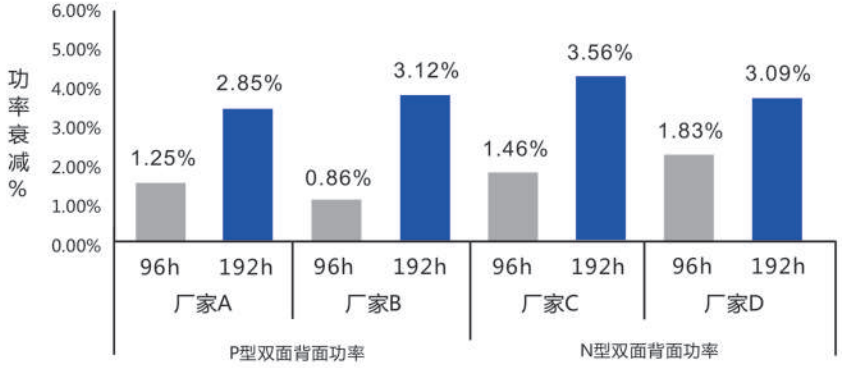
PO Ⅱ 的结构
Structure of PO Ⅱ



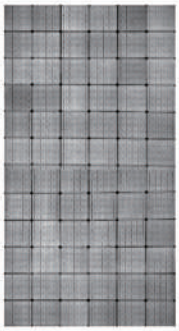
PO Ⅱ 的透光率曲线
Light Transmittance Curve of PO Ⅱ



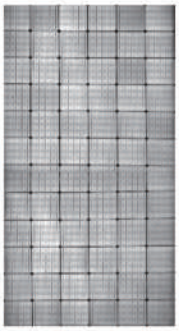
双面组件EVA+PO Ⅱ， PID192h，-1500V包铜箔测试数据
Bifacial Modules with EVA+PO Ⅱ, PID192h, -1500v Covered with Copper



PID后EL图片　　EL Pictures of PID

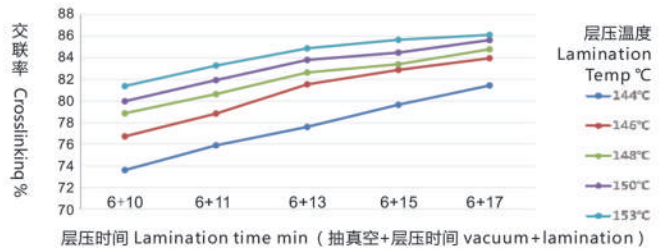

初 始


PID 96h

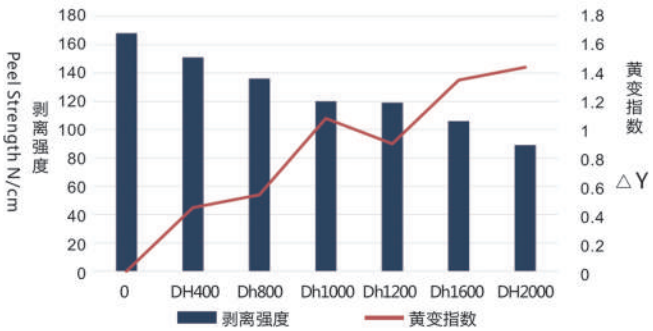

PID 192h

建议层压参数
Recommended Lamination Recipe

Temp 145-153℃, vacuum 6--7 min, keeping12-15 min.



湿热老化黄变剥离强度数据
Peel Strength and Yellowing after DH Test



性能参数　　Property

性能 Property	单位 Unit	测试方法 Test Method	PO II SE 556
拉伸强度（固化后） Tensile Strength (After Lamination)	Mpa	GB/T 13022-91	≥6
断裂伸长率（固化后） Ultimate Elongation(After Lamination)	%		≥450
透光率 Optical Transmission（380-1100nm）	%		> 90
交联度 Gel Content	Gel%	ASTM D2765	> 70
收缩率 Shrinkage Rate（120℃, 3min)	%	ASTM 1204	MD≤3.0
			TD≤2.0
与玻璃剥离强度 Peeling Strength With Glass	N/cm	ASTM D903	> 60
与 TPE 背板剥离强度 Peeling Strength With TPE	N/cm		> 50
体积电阻率 Volume Insulating Resistance	Ω. cm	GB/T1410-2006	$\geq 1\times10^{15}$
耐紫外黄变 UV Light Resistance (120kWh/ m2)	△YI	ASTM G154	< 5.0
耐湿热黄变 Heat/Humidity Resistance (80℃, 85%RH,2000hr)	△YI	ASTM E313	< 5.0

双面电池组件封装方案
Encapsulation Solution for Bifacial Solar Cell

双面电池组件封装方案
Encapsulation Solution for Bifacial Solar Cell

组件类型	双面双玻	透明背板双面组件	白色背板+双面电池
胶膜搭配	PO+PO	PO+PO	PO+PO
	EVA+PO	EVA+PO	EVA+PO
	EVA+PO Ⅱ	EVA+PO Ⅱ	EVA+白色EVA
	EVA+EVA	EVA+EVA	EVA+EVA

EVA+PO模式的搭配方法

EVA+PO模式主要应用于双面组件。由于特殊的PID-p问题，对于N型双面组件，PO应用于组件正面，EVA应用于组件背面。对于P型双面组件，POE应用于组件背面，EVA应用于组件正面。

Matching method of EVA+PO mode

The A+B mode applies primarily to bifacial PV modules. Due to the special PID-p problem, for N-type bifacial PV module, PO is applied to the front and EVA to the back. And this is opposite for P-type bifacial modules.

EVA+PO模式的优点

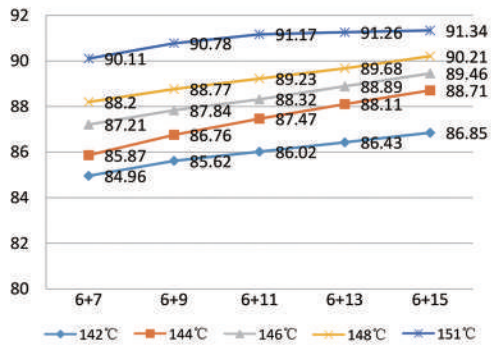
1. 满足双面组件PID-p的需求。
2. 相对PO可适当缩短层压时间。
3. 工艺窗口宽，组件端良率高。

EVA+PO mode collocation method

1. Meet the demand of PID-p in bifacal solar modules.
2. The lamination time can be reduced compared PO.
3. Wide lamination recipe,high production to yield of solar modules.

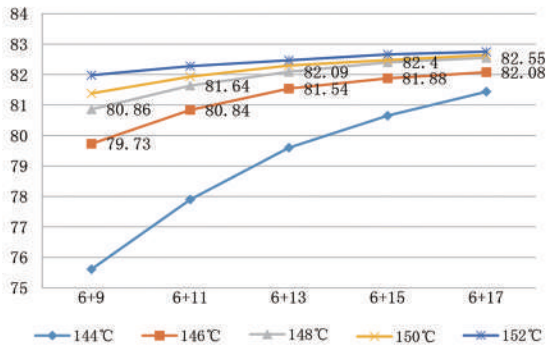
SV-15296P交联率曲线
Crosslinking Properties of SV-15296P

SV-15296P不同工艺交联度
Crosslinking Rate of Different Processes

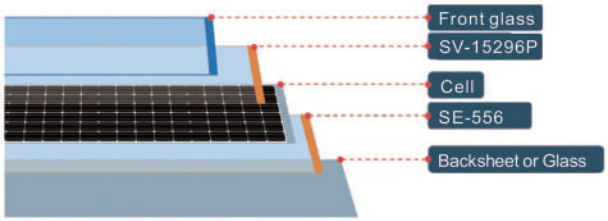


SE-556/SE557交联率曲线
Crosslinking Properties of PO

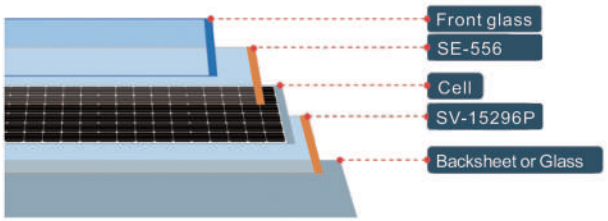
SE- 556不同工艺交联度
Crosslinking Rate of Different Processes



组件叠层结构 Solar Module Encapsulate Structure



P型双面



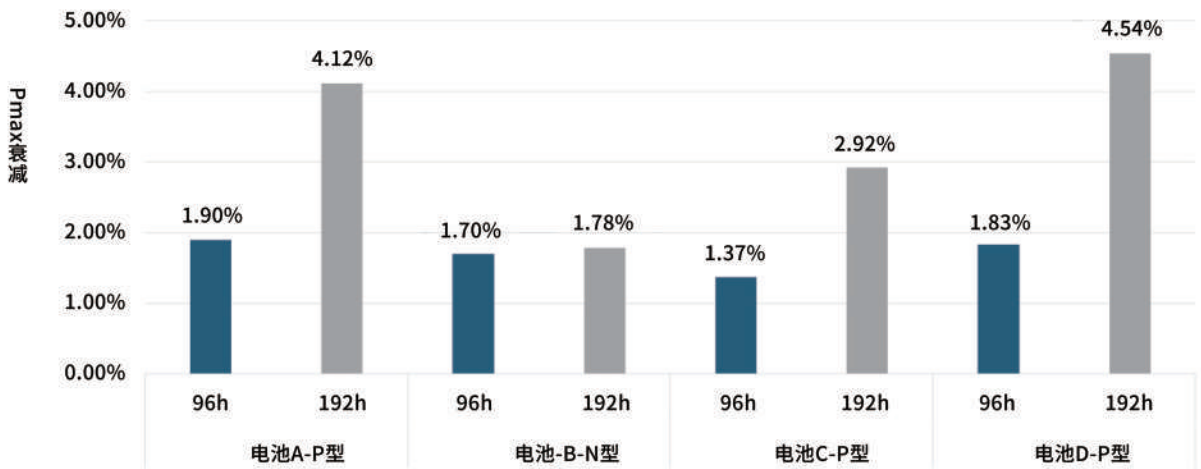
N型双面

双面电池PID-p说明: Introduction of PID-p

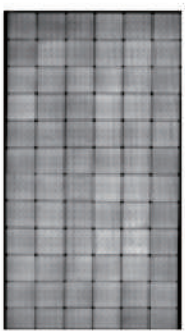
区别于单面电池钠离子导致的PID-s的机理，双面电池是由于电池表面极化导致的衰减，称之为PID-p。斯威克PO在高温高体阻的基础上，添加了抗极化助剂，可满足组件双85条件，-1500V,96h的测试，从而保障组件在电站持续稳定的运营。

Different from PID-s caused by Na^+ in normal cells, bifacial cells are caused by surface polarization, which is called PID-p. On the basis of high volume resistance at 85°C, SVECK PO is added anti-polarization agent, which can meet DH condition of -1500v and 96h, so as to ensure the power station runs stably.

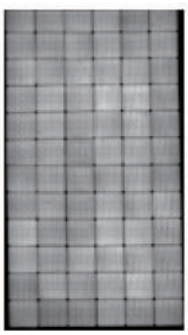
双面组件EVA+PO， PID192h，-1500V包铜箔测试数据
Bifacial Modules with EVA+PO, PID192h, -1500v Covered with Copper



电池A PID EL图片 EL Pictures of Cell A Module after PID



0h



96h

192h

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