



广州日晟新材料科技有限公司
GUANGZHOU RISHENG NEW MATERIAL TECHNOLOGY CO.,LTD

EVA 封装胶膜

EVA Encapsulant Films *For Solar Modules*

技术说明书 **Specification**

广州日晟新材料科技有限公司

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1. 产品基本性质 Basic Property of Product

表 1.EVA 产品基本性质
Tab 1. Basic property of Product

项目 Items	单位 Unit	测试方法 Testing Standard	RS45	RS50
表面花纹 Surface Pattern	-	目测 Eyeballing	单面压花 Single Pattern	
厚度公差 Thickness tolerance	mm	Q/LSXC	±0.05	
收缩率 Shrinkage Rate (120℃, 3min)	%	Q/LSXC	MD ≤3 TD ≤1.5	
交联度 Gel content	%	Q/LSXC	≥80	
粘接力 Adhesion	N/cm	ASTM D903	>60	
紫外截止波长 UV cut off	nm	Q/LSXC	360	300
折光指数 Index of refraction	—	ISO489	1.49	
透光率 Light transmission	%	ASTM D1003	≥91	
熔点 Melting point	℃	ASTM D148	70±5	
熔指 Melt Flow Rate	g/10min	ASTM D1238	22±5	
密度 Density	g/cm3	ISO1183	0.95±0.01	
体积电阻率 Volume resistivity	Ω·cm	ASTM D150	>2×10 ¹⁵	
击穿电压 Breakdown Voltage	KV/mm	ASTM D149	28	
吸水率 Coefficient of water absorption	%	ISO62:2008	<0.1	
水汽透过率 Water vapor transmission rate	(0.5mm) g/m ² ·24h	ISO15106-3: 2003	20-30	
拉伸强度 Tensile strength	MPa	ISO 527-3	>15	
断裂伸长率 Ultimate Elongation	%	ISO 527-3	>500	
耐候性 Durability	%	IEC 61215	Power retention >95%	
抗 PID 性能 PID-FREE	%	85℃、85%RH、 -1500V, 96h	Power loss <5%	
抗蜗牛纹性 Snail trail	----	85℃、85%RH、8A, 500-1000h	No Snail trail	

2. 产品特性 Product Features

◆ 优异的抗 PID 性能 Excellent PID-Free

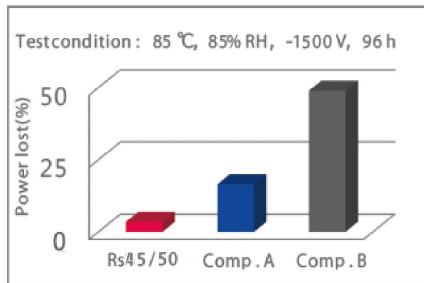


Figure 1 : AntiPID test results (normal solar cells)

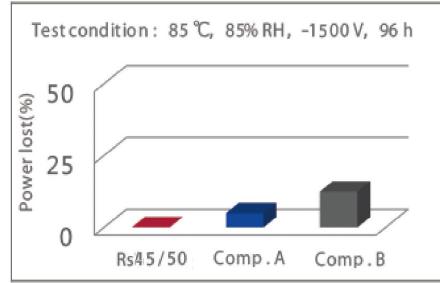


Figure 2 : Anti PID test results (PID-free solar cells)

通过结构改性提高材料体积电阻率，结合离子吸附的机理充分抑制玻璃中金属离子的迁移，使封装材料具备优异的抗 PID 性能，在不同的电池片测试中，具备极高的适应性能。

Improving material volume resistivity through the structure modification, and fully inhibiting migration of glass cationic by combination of ion adsorption mechanism. So, encapsulant films possess excellent PID-free resistance and high ability to adapt in different silicon solar module tests.

◆ 主动防御蜗牛纹 Active prevention snail trail

Test conditions: 85°C、85%RH , 8A

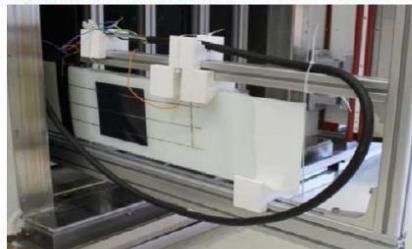


Figure 3: Snail trails test method from Fraunhofer

采用离子选择性吸附精确狙击蜗牛纹发生反应的形成条件，在极端条件下可以最大程度延缓蜗牛纹的产生。

Actively preventing the forming conditions of snail trail through ion selective adsorption and greatly postponing the phenomenon of snail trail in extreme conditions.

Table 1 : snail trails happening time of different combinations

Solar cells \ Encapsulant	C1	C2	C3
Rs45 / 50	OK	OK	54days
Comp . A	OK	46days	15days
Comp . B	OK	28days	7days

◆ 优异的耐候性能 Excellent Durability performance

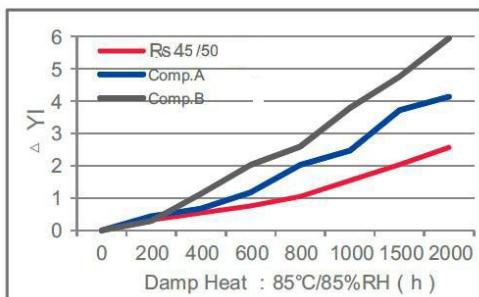


Figure 4 : Yellowness change during damp heat exposure

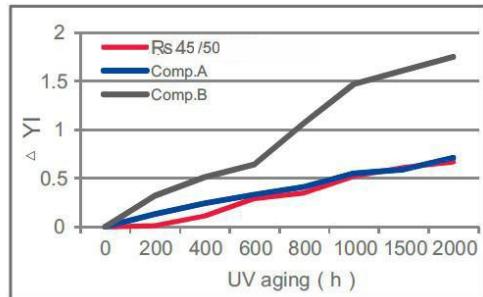


Figure 5 : Yellowness change during UV exposure
(UVA-340nm,1.25W/m² × 8; UVB-313nm,1.25W/m² × 4)

高温高湿以及强紫外辐射环境下，EVA 保持低黄变，可赋予EVA 胶膜的高透光率保持率，可使光伏组件具备更长效的光电转换效率保持。

Encapsulant films possess the lower change of aging Yellowness Index and the higher light transmission persistence in the condition of high temperature, high humidity and strong ultraviolet radiation.

◆ 高兼容性 Excellent compatibility



Figure 6 : Some common compatibility problems (EVA with solar cells、flux、backsheet and glass)

EVA 与玻璃、背板、电池片、助焊剂、焊带、定位胶带易发生兼容性问题，比如焊带白斑、脱层、定位胶带鼓泡、背板凹凸不平，与玻璃低粘接力等等，日晟 EVA 在行业内有约 10 年的应用历史，与市面主流辅材均可匹配。

As your known, EVA encapsulant films have bad compatibility with glass, back sheet, solar cell, scaling powder , solder strip, positioning tape, such as, White spot and delaminating of solder strip, blister of positioning tape, adhesion decline with glass and so on. But, Risheng EVA films have 10 years application history in the field of encapsulant films and can compatible with mainstream auxiliary materials.

◆ 高透光率 High Light transmission

Test: UV-VIS (190nm-900nm);

Structure: glass/EVA(0.5mm)/glass;

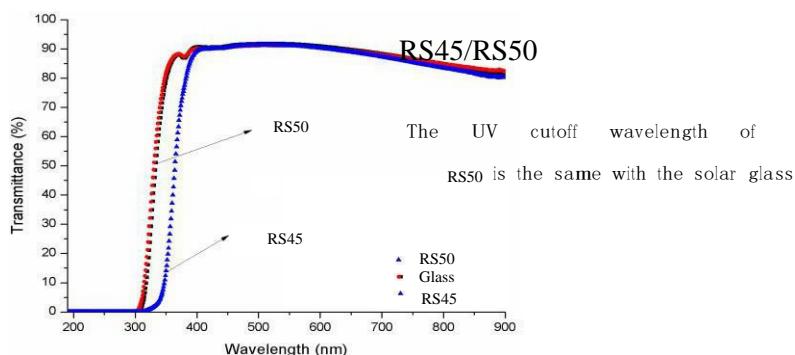


Figure 7. Transmittances of various EVA encapsulants

3. 层压过程 Lamination Steps

◆ 固化方式 Lamination way

✧ 一步法层压 One-step lamination

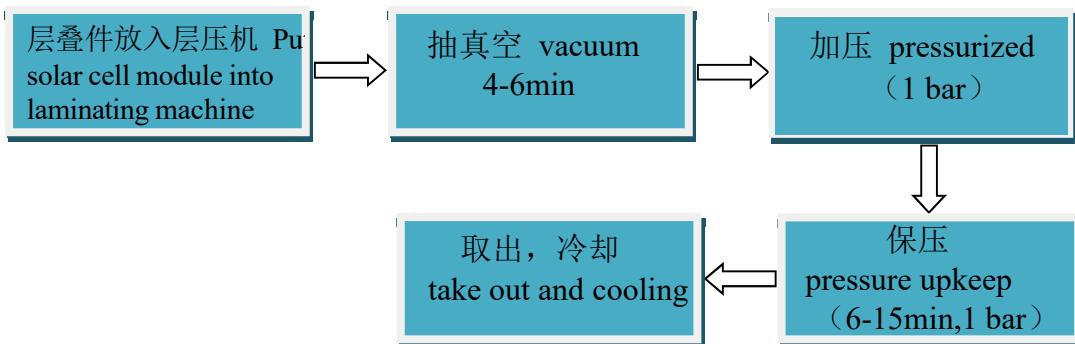


图 8. 一步层压法

Tab 8. One-step lamination steps

◆ 推荐层压工艺 Recommended lamination process (交联度 Gel content >80%)

表 5 推荐层压工艺

Tab 5. Recommended lamination process

封装材料 encapsulant films 层压 lamination		RS45/RS50				
层压机 laminating machine	固化方式 lamination way	一步法 One-step				两步法 Two-step
	温度 temperature(°C)	138	140	143	145	120
	抽真空时间(min) vacuum time	5-6	5-6	4-5	4-5	4-6
高压釜 autoclave	保压时间(min) Pressure upkeep time	12	10	9-10	7-8	5
	釜温度 (°C) temperature	—				145
高压釜 autoclave	固化时间(min) lamination time	—				15-20

层压温度为 138-140°C 是最佳固化条件

The optimal lamination temperature is 138-140°C

4. 产品贮存与要求 Storage and requirements

A EVA 胶膜产品应避光、避热、避潮运输，平整准放，堆放高度不得多于 四层，不得使产品弯曲和包装破损。

Must stored and transported in dark, cool, and dry condition, flatly piled up and the piled height is no more than 4 layers. Must not bend products and damage packaging.

B EVA 胶膜的最佳贮存地点是在恒温、恒湿的仓库内，其温度在 0-30℃ 之间，湿度小于 60%。避免阳光直照，不得靠近有加热设备或有灰尘等污染的地方，并注意防火。

Ensure storage and in a constant temperature and humidity room, temperature range is 0-30 °C , humidity \leqslant 60% 。 Avoid direct sunlight and avoid closing heating equipment and dust pollution place, pay attention to the fire.

C 产品应在规定条件下贮存，贮存期不超出 6 个月。打开包装或裁切后，建议在 24 小时内用完。

Storage life is no more than 6 month under the condition of rules above. It is recommended that use up after open packaging and cutting.

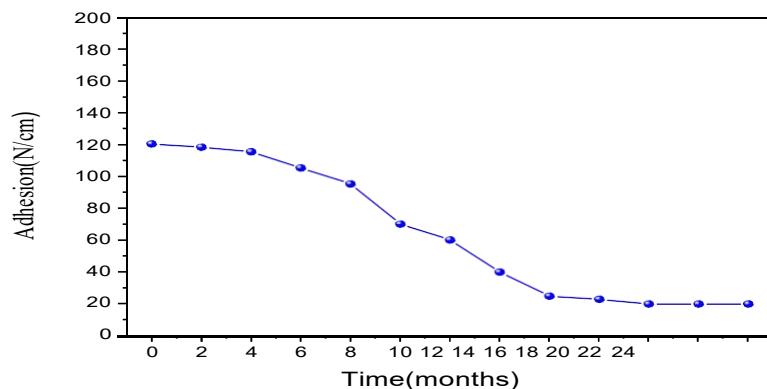


图 12. 贮存时间对 EVA 胶膜粘接力的影响(贮存环境为 25°C、RH50%)

Figure 12. Change of adhesive strength with storage(25°C, RH50%)