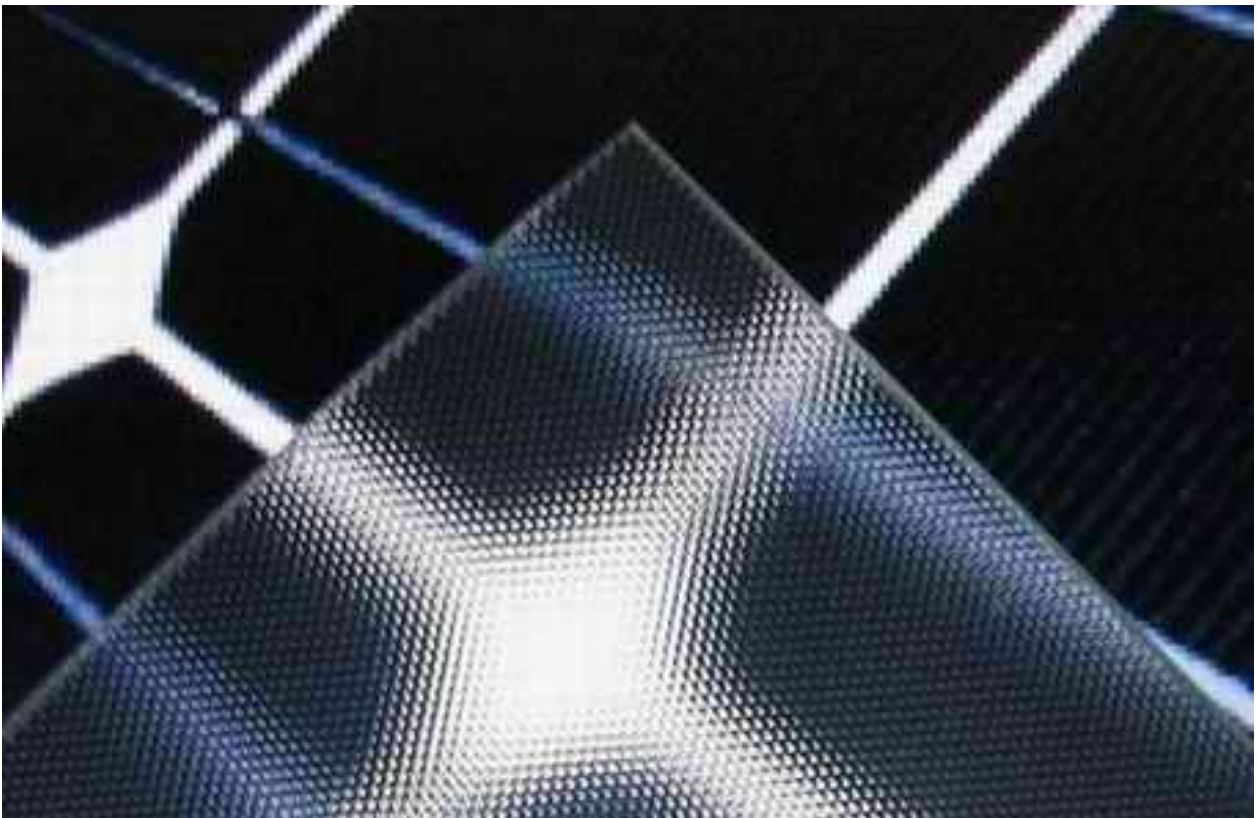


光伏玻璃产品质量规格书

Quality Specification of photovoltaic glass



A 应用范围 Application

应用 Application	晶硅组件专用玻璃 Special glass for crystal silicon assembly
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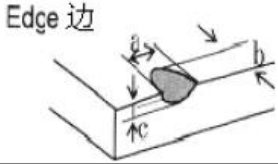
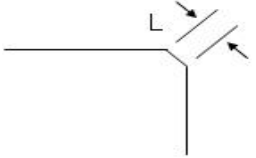
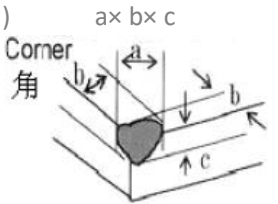
B 玻璃属性 Glass properties

玻璃类型 Type	低铁压花玻璃/浮法玻璃 Low iron patterned glass/float glass		
表面粗糙度 Ra (绒面) Surfaceness 测量设备: Mitutoyo SJ-210P; 仪器参数 Ir/In = 0.8 x 5 Measuring equipment: Mitutoyo SJ-210P; Instrument parameter: Ir/In = 0.8 x 5	0.4-1.2 μ m		
玻璃透过率 TE Transmittance (根据 ISO 9050:2003 (E); 380-1100 nm, AM 1.5) Testing standard according to ISO9050:2003(E). Transmittance band range: 380~1100nm;	>91.5 % for Float glass >93.8% for AR coated glass		
厚度误差 Thickness Tolerance	2.0mm/2.5mm/2.8mm/3.2mm /4.0mm	± 0.15 mm/ ± 0.15 mm/ ± 0.2 mm/ ± 0.25 mm	
外观检查根据 EN 572-5 Appearance: according to EN 572-5 黑色绒布为布景, 加设1000LUX灯光  1米以外可视的无法擦除的脏污不允许 在终端成品内不可见的花纹缺陷允许存在 (如成品组件) 明显的霉点、彩虹、皱纹、线条不允许存在 Visible dirt that cannot be erased from 1 meter away is not allowed. Invisible decorative pattern defects in the end product are allowed to exist.	闭口圆泡 Round Bubble		
	d<0.5mm	不允许密集存在 Dense existence is not permitted	
	0.5 \leq d<1.0mm	允许5 \times S 5 \times S is permitted	
	1.0 \leq d \leq 2.0mm	允许3 \times S 3 \times S is permitted	
	d>2.0mm	不允许 Not permitted	
	闭口长泡 Long Bubble		
	宽度 Width	长度 Length	要求 Requirement
w \leq 0.5mm	L \leq 1.0mm	不允许密集存在	

Obvious mildew spots, rainbows, wrinkles and lines are not allowed			Dense existence is not permitted
		$1.0 < L \leq 3.0\text{mm}$	允许3×S 3×S is permitted
		$3.0 < L \leq 5.0\text{mm}$	允许1×S 1×S is permitted
	$w > 0.5\text{mm}$	$L > 5.0\text{mm}$	不允许 Not permitted
	开口气泡及结石不允许存在 Open bubble and stones are not permitted		
夹杂物/结石：不允许存在 Inclusion is not permitted			
<div style="border: 1px solid black; padding: 5px; display: inline-block; text-align: center;"> 功能区 </div> 距边部 7mm 以内为功能区 镀膜玻璃 AR coated glass	划伤(功能区) Scratches(function area)		
	宽度 Width	长度 Length	要求 Requirement
	$\leq 0.2\text{mm}$	$\leq 5.0\text{mm}$	允许1×S 1×S is permitted
		$> 5.0\text{mm}$	不允许 Not permitted
	$> 0.2\text{mm}$	不允许 Not permitted	
背板釉面 Backplane glass	$\leq 0.1\text{mm}$	$\leq 30\text{mm}$	允许3×S 3×S is permitted
	$> 0.1\text{mm}$		不允许 Not permitted

C
尺寸及边角加工 Dimension and Corner processing

最大生产尺寸 Maximum production size	1200mm*2400mm	
尺寸误差 Dimension error	长度 Length	$\pm 1\text{mm}$
	宽度 Width	$\pm 1\text{mm}$

对角线 Diagonal Tolerance	两条对角线之差不得超过两对角线平均值的0.1% The difference between the two diagonals exceed 0.1% of the average value of the two diagonals is not permitted
边部加工 Edge processing	C型边 'C' shape
崩边 (L×W×D) Edge Defect	最大 3.0×2.0×1.0 (mm) a×b×c 尖锐的突出点不允许 Max:3.0×2.0×1.0 (mm) a×b×c Sharp corner is not permitted 
倒角 Chamfer	机械倒角, 1.0 - 4.0mm Mechanical chamfering, 1.0 - 4.0mm 
崩角 Corner Defect	最大 3.0×2.0×1.0 (mm) a×b×c Max:3.0×2.0×1.0 (mm) a×b×c 
边角破损及亮边 Edge damage and bright side	不允许 Not permitted
打孔尺寸偏差 Hole size deviation	按图纸要求 According to drawing requirements

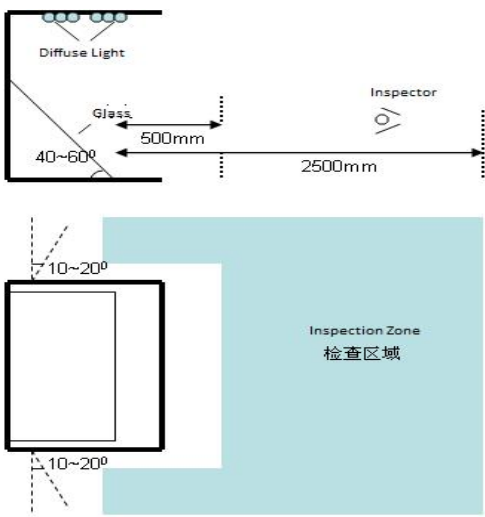
D
钢化玻璃特性 Properties of tempered glass

整体弯曲度 Overall Bow/warp 根据 EN 12150-1 进行测量 Testing standard according to EN 12150-1	$< 3.0\text{mm/m}$
局部弯曲度 Local Bow/warp 根据 EN 12150-1 进行测量 According to EN 12150-1	$< 0.5\text{mm} / 300\text{mm}$
弯曲强度 Bending Strength	2.0mm/2.5mm半钢化玻璃: $\geq 75\text{ MPa}$

根据EN 12150-1 According to EN 12150-1	2.8mm/3.2mm/4.0mm钢化玻璃: ≥ 90 MPa
耐热冲击 (0°C-- 200°C, 200k) Heat shock resistance 根据 EN 12150-1 According to EN 12150-1	通过 Pass
颗粒度 (50×50mm) Fragmentation (50×50mm) 根据 EN 12150-1 According to EN 12150-1	40pcs-120pcs
抗冲击强度 Shock strength 根据 GB15763.2-2005 According to GB15763.2-2005	2.0mm/2.5mm 半钢化玻璃: 用 227g 表面光滑的钢球放在距离试样表面 1m 的高度, 使其自由落下, 玻璃应不破碎; 2.8mm/3.2mm/4.0mm 钢化玻璃: 用 1040g 表面光滑的钢球放在距离试样表面 1m 的高度, 使其自由落下, 玻璃应不破碎; 2.0mm/2.5mm semi-toughened glass: with 227g smooth surface of the steel ball on the height of 1m from the sample surface, so that the free fall, the glass should not be broken; 2.8mm/3.2mm/4.0mm tempered glass: with 1040g smooth surface of the steel ball on the height of 1m from the sample surface, so that the free fall, the glass should not be broken;
静压 (最小承受2400 Pa, 静置1 小时) Static pressure test (2400Pa, 1hour) 根据 EN 12150-1 According to EN 12150-1	不破碎 Not be broken
密度 Density	$\sim 2.5 \times 10^3 \text{Kg/m}^3$

E
涂层质量要求 Film quality requirement

涂层厚度 Film thickness	单层镀膜 (Monolayer): $125 \pm 10\text{nm}$ 双层镀膜 (Bilayer): 表层(surfacelayer): $120 \pm 15\text{nm}$, 底层 (underlayer): $85 \pm 10\text{nm}$ 背板釉层(Backplane glaze layer): $20 \pm 5\mu\text{m}$
透光率 T_e (380-1100nm) Light Transmittance (380~1100nm)	单层镀膜: $\geq 93.8\%$, 双层镀膜: $\geq 94.1\%$ Monolayer: $\geq 93.8\%$, Bilayer: $\geq 94.1\%$
反射率(380~1100nm) Reflectance (380~1100nm)	背板釉层: $>75\%$ (380-1100nm) Backplane glaze layer: $>75\%$ (380-1100nm)

<p>光强2500lx±1500lx</p> <p>由于检查光强不同，检查者观察角度不同，检查者对颜色的辨别能力不同，轻微的色差是允许存在的。</p> <p>Light intensity:2500lx±1500lx.</p> <p>Due to the difference in light intensity, different viewing Angle and different color discrimination ability, slight color difference is allowed.</p> 	<p style="text-align: center;">斑点 spot</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">$\varnothing \leq 1.0\text{mm}$</td> <td style="text-align: center;">不允许密集存在 Dense existence is not permitted</td> </tr> <tr> <td style="text-align: center;">$1.0 < \varnothing \leq 2.0\text{mm}$</td> <td style="text-align: center;">允许5×S 5×S is permitted</td> </tr> <tr> <td style="text-align: center;">$2.0 < \varnothing \leq 5.0\text{mm}$</td> <td style="text-align: center;">允许2×S 2×S is permitted</td> </tr> <tr> <td style="text-align: center;">$\varnothing > 5.0\text{mm}$</td> <td style="text-align: center;">不允许 not permitted</td> </tr> </table> <p style="text-align: center;">条纹 Fringe</p> <p>长度不超过100mm，宽度不超过1mm的条纹每片允许存在2条 未镀膜的条纹不允许存在 Length ≤ 100mm, width ≤ 1 mm:less than 2 line each piece ; Uncoated is not permitted</p> <p style="text-align: center;">表面无法擦除的脏污不允许存在 The dirty can't wiped up is not permitted</p> <p>功能区的镀膜颜色为均匀的颜色，轻微的色差允许存在 The coating color of the function area is uniform, slight color difference is allowed.</p>	$\varnothing \leq 1.0\text{mm}$	不允许密集存在 Dense existence is not permitted	$1.0 < \varnothing \leq 2.0\text{mm}$	允许5×S 5×S is permitted	$2.0 < \varnothing \leq 5.0\text{mm}$	允许2×S 2×S is permitted	$\varnothing > 5.0\text{mm}$	不允许 not permitted
$\varnothing \leq 1.0\text{mm}$	不允许密集存在 Dense existence is not permitted								
$1.0 < \varnothing \leq 2.0\text{mm}$	允许5×S 5×S is permitted								
$2.0 < \varnothing \leq 5.0\text{mm}$	允许2×S 2×S is permitted								
$\varnothing > 5.0\text{mm}$	不允许 not permitted								
<p>表面硬度(三菱铅笔Mitsubishi)</p> <p>Pencil Hardness</p> <p>(根据ISO 15184进行铅笔测试)</p> <p>According to ISO 15184</p>	<p style="text-align: center;">$\geq 4H$</p>								
<p>附着力</p> <p>adhesion</p>	<p>用划格器划出田字形，使用 25mm 宽，半透明压敏胶带粘贴切口，然后迅速撕下胶带，观察切口处情况。镀膜要求为 0 级，镀釉要求 ≤1 级</p> <p>Draw the field shape with a grid marker, paste the incision with 25mm wide, translucent pressure-sensitive tape, and then quickly tear off the tape to observe the incision. The coating requirements are 0 grade, and the coating glaze requirements are ≤1 grade</p>								
<p>耐酸 (24hours)</p>	<p>按照标准JC/T 2170-2013/6.8测试。样品置于 (23±2) °C 的 1mol/L 的盐酸溶液中，浸渍24h。试验后镀膜面板太阳光有</p>								

Anti - acid (根据EN1096-2)	效透射比的平均值衰减不大于1%，涂层无明显脱落、剥离、起皱现象。 According to JC/T 2170-2013/6.8. Dip the sample into HCl solution,which is 1 mol/L at (23 ± 2) °C, testing time:24h. The average reduction in effective solar transmittance after experiment: $\leq 1\%$. Coating inspection:no shedding,stripping or wrinkling on the coating.
盐雾测试 (96小时) Neutral salt spray test (根据EN1096-2)	按照标准JC/T 2170-2013/6.9进行。50g/L \pm 5g/L的NaCl溶液，pH在6.5-7.2范围内，35°C \pm 2°C的温度下连续喷雾，测试时间为96h。试验后镀膜面板太阳光有效透射比的平均衰减应不大于1%，涂层无明显脱落、剥离、起皱现象。 According to JC/T 2170-2013/6.9. 50g/L \pm 5g/L NaCl solution, pH:6.5-7.2, 35°C \pm 2°C,96 hours. The average reduction in effective solar transmittance after experiment: $\leq 1\%$. Coating inspection:no shedding,stripping or wrinkling on the coating.
热循环(TC200) Thermal cycling test (根据IEC61215测试)	按照标准JC/T 2170-2013/6.10测试。使试样温度在 (-40 ± 2) °C和 (85 ± 2) °C之间循环，循环次数为200次。试验后镀膜面板太阳光有效透射比的平均衰减应不大于1%，涂层无明显脱落、剥离、起皱现象。 According to JC/T 2170-2013/6.10. Subject the samples to cycling between temperature of (-40 ± 2) °C and (85 ± 2) °C, 200 cycles. The average reduction in effective solar transmittance after experiment: $\leq 1\%$. Coating inspection:no shedding,stripping or wrinkling on the coating.
湿热测试(DH1000) Damp-heat test (根据IEC61215测试)	按照标准JC/T 2170-2013/6.12进行。相对温度为85°C \pm 2°C，相对湿度为85% \pm 5%，测试时间为1000h。试验后镀膜面板太阳光有效透射比的平均衰减应不大于1%，涂层无明显脱落、剥离、起皱现象。 According to JC/T 2170-2013/6.10.Relative temperature 85 °C \pm 2°C,relative humidity 85% \pm 5%,1000h.The average reduction in effective solar transmittance after experiment: $\leq 1\%$. Coating inspection:no shedding,stripping or wrinkling on the coating.
湿冻测试(HF10) Humidity-freeze Test (根据IEC61215测试)	按照标准JC/T 2170-2013/6.11进行。相对湿度：85% \pm 5%，最高温度85°C \pm 2°C降至-40°C \pm 2°C，循环次数为10次。试验后镀膜面板太阳光有效透射比的平均衰减应不大于1%，涂层无明显脱落、剥离、起皱现象。 According to JC/T 2170-2013/6.11.relative humidity 85% \pm 5%,temperature from 85°C \pm 2°C to -40°C \pm 2°C,10 cycles.The average reduction in effective solar transmittance after experiment: $\leq 1\%$. Coating inspection:no shedding,stripping or wrinkling on the coating.
UV测试(15KWH/M ²)	按照标准JC/T 2170-2013/6.13测试。试样的温度范围为

<p>UV test (根据IEC61215测试)</p>	<p>(60±5)℃, 样品经受波长在280nm-385nm范围的紫外辐照为15kwh•m-2, 其中波长为280-320nm的紫外辐照至少为5kwh•m-2。试验后镀膜面板太阳光有效透射比的平均衰减应不大于1%, 涂层无明显脱落、剥离、起皱现象。</p> <p>According to JC/T 2170-2013/6.13. Make sure that the sample temperature is (60±5)℃. Subject the glasses to a total UV irradiation of 15kwh•m-2 in the wavelength range between 280nm and 385nm, with at least 5kwh•m-2 in the wavelength band between 280nm and 320nm. The average reduction in effective solar transmittance after experiment: ≤1%. Coating inspection: no shedding, stripping or wrinkling on the coating.</p>
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F 玻璃自爆 Glass self-detonation	
<p>允许自爆比例 Allowed self-detonation ratio</p>	<p>100ppm (月自爆数量/月使用数量)</p>

G 化学成分 Chemical constituents	
Si ₂ O	71.5%-73%
Na ₂ O+K ₂ O	13%-14%
CaO + MgO	12%-13%
Al ₂ O ₃	1.2%-1.3%
Fe ₂ O ₃	≤120ppm
Sb ₂ O ₃	≤0.2%

H 玻璃老化发霉 The moldy with age	
<p>生产日期后6个月内不允许有明显的玻璃老化发霉点 Obvious aging mold spots are not allowed within 6 months after the production date.</p>	
<p>玻璃仓储条件: 干燥, 通风, 和玻璃包装物接触的地面及墙壁无积水。 Storage: Maintain it ventilation and dryness, and there is no water on the floor or wall in contact with the glass package</p>	

I
客户投诉 Customer complaint

24小时内联系客户处理，8个工作日内关闭客户投诉

Contact customer for handling within 24 hours, and close customer complaints within 8 working days

J
防护夹纸 Protective paper

适用于钢化玻璃/镀膜玻璃/背板玻璃

Apply to the tempered glass / AR-coating glass / the back glass

弱酸性无尘夹纸 (PH≈5.5)

Weakly acidic dustless paper (PH≈5.5)

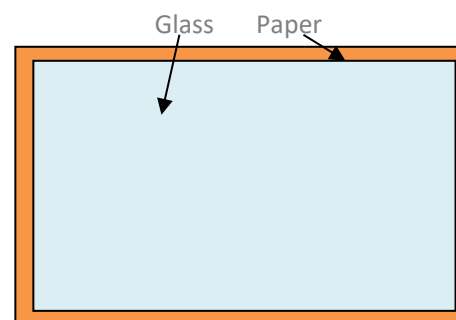
夹纸位置要求

夹纸必须覆盖整个玻璃板面

 纸张超出玻璃边部尺寸为 $10 \pm 5\text{mm}$

The paper position requirement:

The entire glass panel must be covered;

 The paper beyond the glass edge $10 \pm 5\text{mm}$

K
包装 Parking

适用于钢化玻璃/镀膜玻璃/背板玻璃

Apply to the tempered glass / AR-coating glass / the back glass

水平木质托盘包装或铁质打底托盘包装 (一般木托盘净重25KG, 铁托盘净重80KG, 60cells 120片/包,72cells 100片/包)

Wooden pallet or steel pallet (Net weight of wooden pallet:25KG, net weight of steel pallet:80KG,60cells 120 pieces/package,72cells 100pieces/package)

包装箱内玻璃方向

Direction of the glass inside the packing box

压花面朝上放置

Embossed surface face up

包装箱实物图（包装内有6或8包干燥剂）
Physical picture of the packing case
(Contain six or eight packs of desiccant)



批号追踪（异常追溯查询）
Batch number for track

通过箱票和批号可追溯线别、班次、生产日期、作业者
Lines, shifts, production dates and operators can be traced by
box tickets and batch numbers

L 仓储及搬运 Storage and transport

干燥通风，避免剧烈的温湿度变化（气候性变迁），建议温度(25℃±15℃)，建议湿度(55%±10%)，最大单排堆叠4托，叉车叉运过程中低速慢行，禁止激烈驾驶，行使过程中尽量避开颠簸路面。

maintain ventilation and dryness, avoid drastic changes in temperature and humidity,suggest temperature(25℃ ± 15℃),suggest humidity(55%±10%).Maximum single row stack of 4 trays.The forklift travels slowly at low speed during forklift operation,no violent driving and bumpy road.

M 交货期及最小起订量 Delivery date and MOQ

交货期 Delivery date	下正式订单后第5天可发第一车货 The first shipment can be made 5 days after placing an official order
最小起订量 MOQ	28包 28 package

N 物流运输 Logistics transportation

陆运：货柜 20"container 水运：驳船或远洋货轮 By sea

O 联系方式 Contact

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常州天宁区中吴大道566号 No. 566 Zhongwu Ave, Tianning district, Changzhou			