

<div>GAUTAM</div> <div>SOLAR</div>		<div>Gautam Solar Private Limited</div> <div>IPQC Check Sheet</div>			<div>Document No.</div> <div>GSPL/IPQC/IPC/003</div> <div>Issue Date</div> <div>01/12/2024</div> <div>Rev. No./Rev.Date</div> <div>01/30-08-2025</div>	
Date: 2024-11-27		Time:	Shift: A		Po.no.: PO12345	
Sr.No.	Stage	Check point	Quantum of Check Sample Size Frequency	Shift Acceptance Criteria	Monitoring Result	Remarks,If any
1	Shop Floor	Temperature	once per shift	Temp. ≤53°C	Time: 08:00 AM - 27.18°C	OK
		Humidity	once per shift	RH ≤60%	Time: 08:00 AM - 56% RH	OK
2	Glass Loader	Glass dimension(L*W*T)	once per shift	As Per PO	2375.97mm x 1128.71mm x 1.96mm	Within tolerance
		Appearance(Visual)	once per shift	Glass Broken, Crack, Scratches and Line mark not allowed	No Defects Found	Good
3	EVA/EPE Cutting	EVA/EPE Type	once per shift	As per approved BOM	EPE304	OK
		EVA/EPE dimension(L*W*T)	once per shift	As per Specification	2378.62mm x 1124.8mm x 0.67mm	Within tolerance
		EVA/EPE Status	once per shift	Not allowed dust & foreign particle/Cut & non Uniform Embossing /Mfg Date	Uniform Embossing	Acceptable
4	Eva/EPE Soldering at edge(If Applicable)	Soldering Temperature and Quality of Soldering	Once per shift	As per specification and Should be properly soldered (400 ± 20°C)	Time: 08:15 AM - Temp: 385.51°C	Stable
5	Cell Loading	Cell Manufacturer & Eff.	once per shift	Refer Process Card	Longi Solar	No defects
		Cell Size(*W)	once per shift	Refer Process Card	182.57mm x 104.99mm x 0.18mm (L x W x T)	No defects
		Cell Condition	once per shift	Free From dust,finger spot,color variation	EL Test Pass	OK
		Cleanliness of Cell Loading Area	once per shift	No unwanted or waste material should be at Cell Loading Area	Clean Surface	Pass
		Verification of Process Parameter	once per shift	ATW Stringer Specification	Taping Proper	Good
		Cell Cross cutting	once per shift	Both side cutting should be equal.	0.07mm	No defects
		Verification of Process Parameter	once Month	ATW Stringer Specification	Taping Proper	Acceptable

6	Tabber & stringer	Visual Check after Stringing	once 1 String/TS/Shift	TS Visual Criteria	TS01A: OK, TS01B: OK, TS02A: OK, TS02B: OK, TS03A: OK, TS03B: OK	No defects
		EL Image of Strings	once 1 String/TS/Shift	TS EL Criteria	TS01A: OK, TS01B: OK, TS02A: OK, TS02B: OK, TS03A: OK, TS03B: OK, TS04A: OK, TS04B: OK	No defects
		String length	once 1 String/Stringer/ shift	Refer Process Card	TS01A: 1163.5mm, TS01B: 1163.4mm, TS02A: 1163.0mm, TS02B: 1162.3mm, TS03A: 1162.4mm, TS03B: 1163.2mm	—
		Cell to Cell Gap	once 1 String/Stringer/ shift	Refer Process Card	TS01A: 0.74mm, TS01B: 0.78mm, TS02A: 0.74mm, TS02B: 0.77mm, TS03A: 0.78mm, TS03B: 0.76mm, TS04A: 0.78mm	Pass
		Verification of Soldering Peel Strength	2 cell each stringer Front & Back. per shift	Peel Strength $\geq 1N$	TS01A: OK, TS01B: OK, TS02A: OK, TS02B: OK, TS03A: OK, TS03B: OK	OK
		String to String Gap	once per shift		—	Acceptable
		Cell edge to Glass edge distance (Top,bottom & sides)	once per shift	Refer Process Card & Module Drawing	TS01A: OK, TS01B: OK, TS02A: OK, TS02B: OK, TS03A: OK, TS03B: OK	Clear
		Soldering Peel Strength b/w Ribbon to busbar interconnector	once per shift	$\geq 2N$	TS01A: OK, TS01B: OK, TS02A: OK, TS02B: OK, TS03A: OK, TS03B: OK, TS04A: OK, TS04B: OK	Clear
7	Auto bussing , layup & Tapping	Terminal busbar to edge of Cell	once per shift	132 Cell module drawing, Refer Module Drawing- GSPL/N144/G/001	Refer Module Drawing	Pass
		Soldering Quality of Ribbon to busbar	Every 4h per shift	No Dry/Poor Soldering	4.32	Good
		Top & Bottom Creepage Distance/Terminal busbar to Glass Edge.	Every 4h per shift	Creepage distance should be as per process card/Drawing	Top: 12.39mm Bottom: 12.07mm	Acceptable
		Verification of Process Parameter	once per shift	Specification for Auto Bussing	Auto Bussing	—
		Quality of auto taping	Every 4h per shift	Taping should be proper,no Cell Shifting allowed	Proper	OK
8	Auto RFID Logo/Barcode placing (If Applicable)	Position verification of RFIDs Logo /Barcode placing	Every 4h per shift	Should not be tilt	Tilt: -0.64mm	OK
9	EVA/EPE cutting	EVA/EPE Type	once per shift	EVA	EPE304	Confirmed
		EVA/EPE dimension(L*W*T)	once per shift	As per Specification	2377.57mm x 1124.85mm x 0.71mm	OK
		EVA/EPE Status	once per shift	Not allowed dust & foreign particle/Cut & non Uniform Embossing /Mfg Date	Uniform Embossing	Acceptable

10	Back Glass Loader	Glass dimension(L*W*T)	once Per shift	As per PO	2375.93mm x 1128.68mm x 1.98mm	Within tolerance
11	Auto Busbar Flatten (If Applicable)	No. of Holes/ Holes dimension	once Per shift	3 hole with dimension 12mm ± 0.5mm	As per spec	Within tolerance
		Visual Inspection	5 pieces per shift	No crack/ breaks in busbar & properly flattened without bending and twisting	S.No: GS04875KG30225000005, GS04875KG30225000020, GS04875KG30225000022, GS04875KG30225000035, GS04875KG30225000052	Pass
12	Pre lamination EL & Visual Inspection	EL Inspection and Visual Inspection	5 pieces per shift	Pre EL Inspection Criteria, Pre EL Visual Criteria	S.No: GS04875KG30225000027, GS04875KG30225000048, GS04875KG30225000056, GS04875KG30225000069, GS04875KG30225000081	Good
13	String Rework Station	cleaning of rework station/Soldering iron and sponge	once per shift	Rework Station should be Clean/Sponge should be Wet	Clean Surface	Good
		Soldering Iron Temp.	once per shift	400±30°C	Time: 08:00 - Temp: 27.24°C	OK
14	Module Rework Station	Method of Rework	once per shift	As per WI (GSPL/P/WI/012)	As per spec	Good
		Cleaning of Rework station/Soldering iron sponge	once per shift	Rework Station should be Clean/Sponge should be Wet	No Residue - CLEAN	OK
		Soldering Iron Temp.	once per shift	400±30°C	Time: 08:00 - Temp: 26.92°C	Pass
15	Laminator	Monitoring of Laminator Process parameter	once per shift	Process Parameter of jinchen Laminator	As per spec	Pass
		Cleaning of Diaphragm/release sheet	once 24h	Diaphragm/Release sheet should be clean,No EVA residue is allowed	Clean Surface	OK
16	Auto Tape Removing (If Applicable)	Peel of Test b/w: EVA/Backsheet EVA/EPE/POE to Glass	All position All laminators to be covered in a month	E/G ≥60N/cm E /Bs≥60N/cm	As per spec	Pass
		Gel Content Test		75to 95%	As per spec	No defects
		Visual Check after Lamination	5 pieces per shift	Check Tape Removing Should be smooth and No visual bubble Should be found.	S.No: GS04875KG30225000006, GS04875KG30225000022, GS04875KG30225000091, GS04875KG30225000092, GS04875KG30225000099	No defects
17	Auto Edge Trimming	Trimming Quality	5 pieces per shift	Excess layer from the glass edge should be removed,Uneven Trimming not allowed	Even Trim: 0.42mm deviation	—
		Trimming Blade life cycle	once per month	Worn out not allowed	Even Trim: -0.17mm deviation	Good

18	90° Visual Inspection	Visual Inspection	5 pieces per shift	Post Lam Visual Inspection Criteria	S.No: GS04875KG30225000013, GS04875KG30225000054, GS04875KG30225000057, GS04875KG30225000080, GS04875KG30225000085	No defects
19	Framing	Glue uniformity & continuity in frame groove	1 set per shift	Should be uniform,Back sealing should be proper	As per spec	—
		Short Side Glue Weight	once Per shift	Till as per Specification	Potting Weight: 19.28g	Pass
		Long Side Glue Weight	once Per shift		Potting Weight: 21.96g	Good
		Anodizing Thickness	once Per shift	≥15 micron	As per spec	Pass
20	Junction Box Assembly	Junction Box(Connector Appearance & Cable Length)	once Per shift	As per Process Card & module drawing	JB Position: -0.45mm shift	As per spec
		Silicon Glue Weight on the bottom (g)	once Per shift	21±6 gm	Potting Weight: 24.12g	OK
		Max Welding time	once Per shift	As per Specification	As per spec	OK
21	Auto JB Soldering	Soldering current	once per shift	As per Specification	As per spec	Pass
		Soldering Quality	once per shift	Welding area should be fully covered & checked by twizzer,no yellowing allowed	As per spec	Pass
22	JB Potting	A/B Glue Ratio	once Per shift	As per Specification	As per spec	Pass
		Potting material weight	once Per shift	21±6 gm	EPE304	Confirmed
		Nozzle Changing	once every 6h	Should be changed after 6 hours or when found issue of damage or extra amount dispensing.	As per spec	OK
23	OLE Potting Inspection (If Applicable)	Visual Check	once 5 piece	Potting should be properly filled, and mounting hole should be as per drawing.	As per spec	Pass
24	Curing	Temperature	once per shift	25±3■	Time: 08:00 - Temp: 24.23°C	OK
		Humidity	once per shift	≤50%	Time: 08:00 - RH: 58%	Within Limit
		Curing Time(H)	once Per shift	≥4 hours	As per spec	Pass

25	Buffing	Corner Edge-Buffing belt condition	5 pieces per shift	Should not be sharp & No worn out	FF: 77.99%	OK
26	Cleaning	Module should be free from Tape,Dust,Dirt,EVA/Backs heet residue,Corner Burrs,Glue residue on glass,backsheet,JB,Wire etc.)	5 pieces per shift	Post Lam Visual Criteria	S.No: GS04875KG30225000021, GS04875KG30225000032, GS04875KG30225000041, GS04875KG30225000092, GS04875KG30225000096	OK
27	Flash Tester	Ambient Temp.	once per shift	25±3■	Time: 08:00 - Temp: 23.47°C	Good
		Module Temp.	once per shift	25±3■	Time: 08:00 - Temp: 23.42°C	—
		Isc/simulator Calibration	once 12h	Isc/simulation should be calibrated at the start of the shift with Golden/Silver module(GSEN/QA/K/11)	Isc: 13.23A	OK
		Validation	once every 4h	As per GSEN/QA/K/11	As per spec	Good
		Silver Reference Module Iv Check	once Two weeks	Should be same as original I-v picture	As per spec	Good
28	Hipot Test	DCW/IR/Ground continuity	5 pieces per shift	≤50μA , >40MΩ·m² , (0-100) mΩ	S.No: GS04875KG30225000020, GS04875KG30225000041, GS04875KG30225000052, GS04875KG30225000059, GS04875KG30225000083	Acceptable
29	Post EL Test	Verification of current configuration in DC power supply	once Shift	As per WI (GSPL/P/WI/027)	Pmax: 624.06W	Acceptable
		EL Inspection and Visual Inspection	5 pieces per shift	Post EL Inspection Criteria, Post EL Visual Criteria	S.No: GS04875KG30225000003, GS04875KG30225000057, GS04875KG30225000075, GS04875KG30225000089, GS04875KG30225000093	No defects
30	RFID	RFID Position	once per shift	As per Process card	Tilt: 0.03mm	OK
		Cell & Module Make & Manufacturing Month Verification	once per shift	As per BOM and Process card	As per spec	Clear
31	Final Visual Inspection	Visual Inspection	5 pieces per shift	Post lam visual inspection criteria	S.No: GS04875KG30225000014, GS04875KG30225000016, GS04875KG30225000065, GS04875KG30225000071, GS04875KG30225000075	OK
		Re-label	5 pieces per shift	No bubble,Tilt,Align,no folded label not acceptable	Tilt: -0.37mm	Clear

32	Dimension measurement	L*W and Module Profile	once per shift	As per Module drawing ($\pm 1\text{mm}$)	Refer Module Drawing	Pass
		Mounting Hole X & Y (H/L)	once Per shift		As per spec	Pass
		Diagonal Difference	once Per shift	$\leq 3\text{mm}$	FF: 77.7%	Pass
		Corner Gap	once Per shift	As per visual inspection criteria	As per spec	As per spec
		JB Cable length	once Per shift	As per Process Card	Cable: 1186.36mm	As per spec
33	Packaging	Packaging Label	once Per shift	WI For Packaging	Tilt: -0.21mm	Clear
		Content in Box	once Per shift		As per spec	Pass
		Box Condition	once Per shift	Damage,dull printing,wet boxes not allowed	As per spec	Good
		Wooden Pallet dimension	once Per shift	should not be less than module dimension	As per spec	As per spec
34	Peel Test for Solar Cell	EVA to Glass Peel Strength	3 samples Per shift	$\geq 60\text{ N/cm}$	As per spec	Clear
		EVA to Backsheet Peel Strength	3 samples Per shift	$\geq 60\text{ N/cm}$	As per spec	Pass
		Cell to EVA Adhesion Test	2 samples Per shift	$\geq 50\text{ N/cm}$	As per spec	Clear
		Ribbon to Cell Busbar Peel Strength (Front)	2 cells per stringer Per shift	$\geq 1.0\text{ N}$	Test1: 21.49N Test2: 20.91N Test3: 20.8N	Clear
		Ribbon to Cell Busbar Peel Strength (Back)	2 cells per stringer Per shift	$\geq 1.0\text{ N}$	Test1: 20.22N Test2: 21.26N Test3: 21.02N	No defects
		EVA/EPE to Glass Interface Adhesion	2 samples Per day	$\geq 55\text{ N/cm}$, No delamination	As per spec	—
		Junction Box Adhesion (Silicon Glue)	1 sample Per shift	$\geq 40\text{ N/cm}$	JB Position: 0.38mm shift	Acceptable
		Peel Test Temperature	Continuous During test	$23\pm 2^\circ\text{C}$	Time: 08:00 - Temp: 27.44°C	OK
		Test Sample Conditioning Time	All samples Before test	$\geq 24\text{ hours at } 23\pm 2^\circ\text{C}$	As per spec	OK
		Peel Test Equipment Calibration	Equipment Monthly	Calibrated as per standard, Certificate valid	As per spec	Pass