

<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 - 24.16°C	OK
		Humidity	once per shift	RH ≤60%	Time: 08:00 AM - 42% RH	Acceptable
2	Glass Loader	Glass dimension(L*W*T)	once per shift	As Per PO	2376.73mm x 1127.61mm x 1.97mm	As per spec
		Appearance(Visual)	once per shift	Glass Broken, Crack, Scratches and Line mark not allowed	Clear Surface	No defects
3	EVA/EPE Cutting	EVA/EPE Type	once per shift	As per approved BOM	EPE304	Confirmed
		EVA/EPE dimension(L*W*T)	once per shift	As per Specification	2378.06mm x 1125.2mm x 0.68mm	Within tolerance
		EVA/EPE Status	once per shift	Not allowed dust & foreign particle/Cut & non Uniform Embossing /Mfg Date	Uniform Embossing	OK
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: 400.08°C	Controlled
5	Cell Loading	Cell Manufacturer & Eff.	once per shift	Refer Process Card	Solar Space	Clear
		Cell Size(*W)	once per shift	Refer Process Card	182.52mm x 105.03mm x 0.16mm (L x W x T)	OK
		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	No defects
		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.	-0.06mm	Pass
		Verification of Process Parameter	once Month	ATW Stringer Specification	Taping Proper	Good

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, TS04A: OK, TS04B: OK	OK
		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	Pass
		String length	once 1 String/Stringer/ shift	Refer Process Card	TS01A: 1163.5mm, TS01B: 1162.6mm, TS02A: 1162.5mm, TS02B: 1163.4mm, TS03A: 1163.7mm, TS03B: 1162.2mm	OK
		Cell to Cell Gap	once 1 String/Stringer/ shift	Refer Process Card	TS01A: 0.75mm, TS01B: 0.77mm, TS02A: 0.74mm, TS02B: 0.73mm, TS03A: 0.73mm, TS03B: 0.76mm	OK
		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, TS04A: OK, TS04B: OK	OK
		String to String Gap	once per shift		—	As per spec
		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, TS04A: OK, TS04B: OK	OK
		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	Pass
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	2.68	Pass
		Top & Bottom Creepage Distance/Terminal busbar to Glass Edge.	Every 4h per shift	Creepage distance should be as per process card/Drawing	Top: 11.72mm Bottom: 12.36mm	OK
		Verification of Process Parameter	once per shift	Specification for Auto Bussing	Taping Proper	—
		Quality of auto taping	Every 4h per shift	Taping should be proper,no Cell Shifting allowed	Proper	—
8	Auto RFID Logo/Barcode placing (If Applicable)	Position verification of RFIDs Logo /Barcode placing	Every 4h per shift	Should not be tilt	Tilt: 0.62mm	Good
9	EVA/EPE cutting	EVA/EPE Type	once per shift	EVA	EPE304	Verified
		EVA/EPE dimension(L*W*T)	once per shift	As per Specification	2378.77mm x 1125.03mm x 0.69mm	As per spec
		EVA/EPE Status	once per shift	Not allowed dust & foreign particle/Cut & non Uniform Embossing /Mfg Date	No Damage	—

10	Back Glass Loader	Glass dimension(L*W*T)	once Per shift	As per PO	2375.64mm x 1128.46mm x 2.0mm	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: GS04875KG30225000009, GS04875KG30225000025, GS04875KG30225000071, GS04875KG30225000078, GS04875KG30225000086	Clear
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: GS04875KG30225000022, GS04875KG30225000026, GS04875KG30225000033, GS04875KG30225000037, GS04875KG30225000065	Clear
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	Clean
		Soldering Iron Temp.	once per shift	400±30°C	Time: 08:00 - Temp: 25.7°C	—
14	Module Rework Station	Method of Rework	once per shift	As per WI (GSPL/P/WI/012)	As per spec	—
		Cleaning of Rework station/Soldering iron sponge	once per shift	Rework Station should be Clean/Sponge should be Wet	CLEAN - No EVA Residue	Clean
		Soldering Iron Temp.	once per shift	400±30°C	Time: 08:00 - Temp: 26.69°C	Acceptable
15	Laminator	Monitoring of Laminator Process parameter	once per shift	Process Parameter of jinchen Laminator	As per spec	Acceptable
		Cleaning of Diaphragm/release sheet	once 24h	Diaphragm/Release sheet should be clean,No EVA residue is allowed	No Residue - CLEAN	No defects
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	OK
		Gel Content Test		75to 95%	As per spec	OK
		Visual Check after Lamination	5 pieces per shift	Check Tape Removing Should be smooth and No visual bubble Should be found.	S.No: GS04875KG30225000023, GS04875KG30225000026, GS04875KG30225000037, GS04875KG30225000078, GS04875KG30225000096	Clear
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: -0.2mm deviation	—
		Trimming Blade life cycle	once per month	Worn out not allowed	Even Trim: 0.24mm deviation	Good

18	90° Visual Inspection	Visual Inspection	5 pieces per shift	Post Lam Visual Inspection Criteria	S.No: GS04875KG30225000021, GS04875KG30225000024, GS04875KG30225000026, GS04875KG30225000046, GS04875KG30225000061	OK
19	Framing	Glue uniformity & continuity in frame groove	1 set per shift	Should be uniform,Back sealing should be proper	As per spec	Pass
		Short Side Glue Weight	once Per shift	Till as per Specification	Potting Weight: 17.88g	OK
		Long Side Glue Weight	once Per shift		Potting Weight: 16.21g	OK
		Anodizing Thickness	once Per shift	≥15 micron	As per spec	OK
20	Junction Box Assembly	Junction Box(Connector Appearance & Cable Length)	once Per shift	As per Process Card & module drawing	JB Position: -0.18mm shift	Match PO
		Silicon Glue Weight on the bottom (g)	once Per shift	21±6 gm	Potting Weight: 21.64g	Pass
		Max Welding time	once Per shift	As per Specification	As per spec	Clear
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	OK
		Potting material weight	once Per shift	21±6 gm	EPE304	As per BOM
		Nozzle Changing	once every 6h	Should be changed after 6 hours or when found issue of damage or extra amount dispensing.	As per spec	Pass
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	Clear
24	Curing	Temperature	once per shift	25±3■	Time: 08:00 - Temp: 25.05°C	Controlled
		Humidity	once per shift	≤50%	Time: 08:00 - RH: 40%	Within Limit
		Curing Time(H)	once Per shift	≥4 hours	As per spec	OK

25	Buffing	Corner Edge-Buffering belt condition	5 pieces per shift	Should not be sharp & No worn out	FF: 78.16%	Pass
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: GS04875KG30225000001, GS04875KG30225000023, GS04875KG30225000053, GS04875KG30225000060, GS04875KG30225000066	No contamination
27	Flash Tester	Ambient Temp.	once per shift	25±3■	Time: 08:00 - Temp: 25.19°C	Good
		Module Temp.	once per shift	25±3■	Time: 08:00 - Temp: 25.77°C	Good
		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: 13.35A	—
		Validation	once every 4h	As per GSEN/QA/K/11	As per spec	OK
		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: GS04875KG30225000025, GS04875KG30225000043, GS04875KG30225000066, GS04875KG30225000083, GS04875KG30225000089	—
29	Post EL Test	Verification of current configuration in DC power supply	once Shift	As per WI (GSPL/P/WI/027)	Pmax: 625.69W	OK
		EL Inspection and Visual Inspection	5 pieces per shift	Post EL Inspection Criteria, Post EL Visual Criteria	S.No: GS04875KG30225000004, GS04875KG30225000011, GS04875KG30225000027, GS04875KG30225000063, GS04875KG30225000087	Pass
30	RFID	RFID Position	once per shift	As per Process card	Tilt: -0.46mm	—
		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: GS04875KG30225000004, GS04875KG30225000029, GS04875KG30225000052, GS04875KG30225000086, GS04875KG30225000089	Pass
		Re-label	5 pieces per shift	No bubble,Tilt,Align,no folded label not acceptable	Tilt: 0.76mm	No defects

32	Dimension measurement	L*W and Module Profile	once per shift	As per Module drawing ($\pm 1\text{mm}$)	Refer Module Drawing	—
		Mounting Hole X & Y (H/L)	once Per shift		As per spec	Pass
		Diagonal Difference	once Per shift	$\leq 3\text{mm}$	FF: 78.95%	Acceptable
		Corner Gap	once Per shift	As per visual inspection criteria	As per spec	Within tolerance
		JB Cable length	once Per shift	As per Process Card	Cable: 1182.41mm	Within tolerance
33	Packaging	Packaging Label	once Per shift	WI For Packaging	Tilt: 0.2mm	OK
		Content in Box	once Per shift		As per spec	Acceptable
		Box Condition	once Per shift	Damage,dull printing,wet boxes not allowed	As per spec	Acceptable
		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	Pass
		EVA to Backsheet Peel Strength	3 samples Per shift	$\geq 60\text{ N/cm}$	As per spec	Clear
		Cell to EVA Adhesion Test	2 samples Per shift	$\geq 50\text{ N/cm}$	As per spec	Pass
		Ribbon to Cell Busbar Peel Strength (Front)	2 cells per stringer Per shift	$\geq 1.0\text{ N}$	Test1: 20.41N Test2: 20.29N Test3: 21.78N	Clear
		Ribbon to Cell Busbar Peel Strength (Back)	2 cells per stringer Per shift	$\geq 1.0\text{ N}$	Test1: 21.18N Test2: 20.44N Test3: 21.37N	Clear
		EVA/EPE to Glass Interface Adhesion	2 samples Per day	$\geq 55\text{ N/cm}$, No delamination	As per spec	Pass
		Junction Box Adhesion (Silicon Glue)	1 sample Per shift	$\geq 40\text{ N/cm}$	JB Position: 0.51mm shift	—
		Peel Test Temperature	Continuous During test	$23\pm 2^{\circ}\text{C}$	Time: 08:00 - Temp: 23.93°C	OK
		Test Sample Conditioning Time	All samples Before test	$\geq 24\text{ hours at } 23\pm 2^{\circ}\text{C}$	As per spec	Acceptable
		Peel Test Equipment Calibration	Equipment Monthly	Calibrated as per standard, Certificate valid	As per spec	OK