| GAUTAM<br>SOLAR | Gautam Solar Private Limited<br>IPQC Check Sheet | **Document No.**<br>GSPL/IPQC/IPC/003<br>**Issue Date**<br>01/12/2024<br>**Rev. No./Rev.Date**<br>01/30-08-2025 |
|---|---|---|

| **Date:** 2025-11-27 | **Time:** | **Shift:** A | **Po.no.:** s |
|---|---|---|---|

| Sr.No. | Stage | Check point | Quantum of Check<br>Sample Size \| Frequency | Shift<br>Acceptance Criteria | Monitoring Result | Remarks,If any |
|---|---|---|---|---|---|---|
| 1 | Shop Floor | Temperature | once<br>per shift | Temp. ≤53°C | 23.43°C | Within Limit |
| | | Humidity | once<br>per shift | RH ≤60% | 48% RH | Acceptable |
| 2 | Glass Loader | Glass dimension(L*W*T) | once<br>per shift | As Per PO | 2375.69mm x 1127.92mm x 2.0mm | — |
| | | Appearance(Visual) | once<br>per shift | Glass Broken, Crack, Scratches and Line mark not allowed | No Defects Found | No defects |
| 3 | EVA/EPE Cutting | EVA/EPE Type | once<br>per shift | As per approved BOM | EPE304 | Confirmed |
| | | EVA/EPE dimension(L*W*T) | once<br>per shift | As per Specification | 2377.91mm x 1124.87mm x 0.67mm | OK |
| | | EVA/EPE Status | once<br>per shift | Not allowed dust & foreign particle/Cut & non Uniform Embossing /Mfg Date | Clean Surface | Pass |
| 4 | Eva/EPE Soldering at edge(If Applicable) | Soldering Temperature and Quality of Soldering | Once<br>per shift | As per specification and Should be properly soldered ( 400 ± 20°C) | 385.32°C | Stable |
| 5 | Cell Loading | Cell Manufacturer & Eff. | once<br>per shift | Refer Process Card | Solar Space | OK |
| | | Cell Size(*W) | once<br>per shift | Refer Process Card | 182.44mm x 105.06mm x 0.16mm (L x W x T) | No defects |
| | | Cell Condition | once<br>per shift | Free From dust,finger spot,color variation | No Damage/Cracks | No defects |
| | | Cleanliness of Cell Loading Area | once<br>per shift | No unwanted or waste material should be at Cell Loading Area | Clean Surface | No defects |
| | | Verification of Process Parameter | once<br>per shift | ATW Stringer Specification | Verify | — |
| | | Cell Cross cutting | once<br>per shift | Both side cutting should be equal. | -0.03mm | No defects |
| | | Verification of Process Parameter | once<br>Month | ATW Stringer Specification | Verify | Pass |

| | | | | | | |
|---|---|---|---|---|---|---|
| 6 | Tabber & stringer | Visual Check after Stringing | once<br>1 String/TS/Shift | TS Visual Criteria | TS01A: OK, TS01B: OK, TS02A: OK, TS02B: OK, TS03A: OK, TS03B: OK, TS04A: OK, TS04B: OK | No defects |
| | | EL Image of Strings | once<br>1 String/TS/Shift | TS EL Criteria | TS01A: OK, TS01B: OK, TS02A: OK, TS02B: OK, TS03A: OK, TS03B: OK | Pass |
| | | String length | once<br>1 String/Stringer/ shift | Refer Process Card | TS01A: 1163.4mm, TS01B: 1163.5mm, TS02A: 1163.4mm, TS02B: 1163.2mm, TS03A: 1163.3mm, TS03B: 1163.7mm, TS04A: 1162.9mm | Match PO |
| | | Cell to Cell Gap | once<br>1 String/Stringer/ shift | Refer Process Card | TS01A: 0.78mm, TS01B: 0.76mm, TS02A: 0.78mm, TS02B: 0.77mm, TS03A: 0.75mm, TS03B: 0.79mm | Pass |
| | | Verification of Soldering Peel Strength | 2 cell each stringer Front & Back.<br>per shift | Peel Strength ≥1N | TS01A: OK, TS01B: OK, TS02A: OK, TS02B: OK, TS03A: OK, TS03B: OK | No defects |
| | | String to String Gap | once<br>per shift | | 3.25mm | Acceptable |
| | | Cell edge to Glass edge distance (Top,bottom & sides) | once<br>per shift | Refer Process Card & Module Drawing | TS01A: OK, TS01B: OK, TS02A: OK, TS02B: OK, TS03A: OK, TS03B: OK, TS04A: OK | Clear |
| | | Soldering Peel Strength b/w Ribbon to busbar interconnector | once<br>per shift | ≥2N | TS01A: OK, TS01B: OK, TS02A: OK, TS02B: OK, TS03A: OK, TS03B: OK, TS04A: OK | Clear |
| 7 | Auto bussing , layup & Tapping | Terminal busbar to edge of Cell | once<br>per shift | 132 Cell module drawing, Refer Module Drawing- GSPL/N144/G/001 | 6.01mm | No defects |
| | | Soldering Quality of Ribbon to busbar | Every 4h<br>per shift | No Dry/Poor Soldering | OK, OK, OK | Good |
| | | Top & Bottom Creepage Distance/Terminal busbar to Glass Edge. | Every 4h<br>per shift | Creepage distance should be as per process card/Drawing | Top: 11.76mm, 11.69mm, 11.81mm \| Bottom: 11.63mm, 11.56mm, 11.57mm | Acceptable |
| | | Verification of Process Parameter | once<br>per shift | Specification for Auto Bussing | Verify | Acceptable |
| | | Quality of auto taping | Every 4h<br>per shift | Taping should be proper,no Cell Shifting allowed | Proper, Proper, Proper | — |
| 8 | Auto RFID Logo/Barcode placing (If Applicable) | Position verification of RFIDs Logo /Barcode placing | Every 4h<br>per shift | Should not be tilt | Center, Center, Center | Acceptable |
| 9 | EVA/EPE cutting | EVA/EPE Type | once<br>per shift | EVA | EPE304 | As per BOM |
| | | EVA/EPE dimension(L*W*T) | once<br>per shift | As per Specification | 2378.77mm x 1125.35mm x 0.68mm | Match PO |
| | | EVA/EPE Status | once<br>per shift | Not allowed dust & foreign particle/Cut & non Uniform Embossing /Mfg Date | Uniform Embossing | Good |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10 | Back Glass Loader | Glass dimension(L*W*T) | once<br>Per shift | As per PO | 2376.77mm x 1127.86mm x 2.03mm | Within tolerance |
| 11 | Auto Busbar Flatten (If Applicable) | No. of Holes/ Holes dimension | once<br>Per shift | 3 hole with dimension 12mm ± 0.5mm | 3 holes: 11.81mm, 12.04mm, 11.81mm | As per spec |
| | | Visual Inspection | 5 pieces<br>per shift | No crack/ breaks in busbar & properly flattened without bending and twisting | S.No: GS04875KG30225045025, GS04875KG30225045059, GS04875KG30225045060, GS04875KG30225045068, GS04875KG30225045078 - Found OK | OK |
| 12 | Pre lamination EL & Visual Inspection | EL Inspection and Visual Inspection | 5 pieces<br>per shift | Pre EL Inspection Criteria, Pre EL Visual Criteria | S.No: GS04875KG30225045023, GS04875KG30225045040, GS04875KG30225045052, GS04875KG30225045084, GS04875KG30225045099 - Found OK | Clear |
| 13 | String Rework Station | cleaning of rework station/Soldering iron and sponge | once<br>per shift | Rework Station should be Clean/Sponge should be Wet | No Residue - CLEAN | Clean |
| | | Soldering Iron Temp. | once<br>per shift | 400±30°C | Time: 08:00 - Temp: 23.01°C | Pass |
| 14 | Module Rework Station | Method of Rework | once<br>per shift | As per WI (GSPL/P/WI/012) | As per spec | Good |
| | | Cleaning of Rework station/Soldering iron sponge | once<br>per shift | Rework Station should be Clean/Sponge should be Wet | No Residue - CLEAN | Good |
| | | Soldering Iron Temp. | once<br>per shift | 400±30°C | Time: 08:00 - Temp: 24.14°C | Acceptable |
| 15 | Laminator | Monitoring of Laminator Process parameter | once<br>per shift | Process Parameter of jinchen Laminator | As per spec | OK |
| | | Cleaning of Diaphragm/release sheet | once<br>24h | Diaphragm/Release sheet should be clean,No EVA residue is allowed | Clean Surface | Pass |
| 16 | Auto Tape Removing (If Applicable) | Peel of Test b/w: EVA/Backsheet EVA/EPE/POE to Glass | All position<br>All laminators to be covered in a month | E/G ≥60N/cm E /Bs≥60N/cm | As per spec | Clear |
| | | Gel Content Test | | 75to 95% | As per spec | No defects |
| | | Visual Check after Lamination | 5 pieces<br>per shift | Check Tape Removing Should be smooth and No visual bubble Should be found. | S.No: GS04875KG30225045004, GS04875KG30225045035, GS04875KG30225045047, GS04875KG30225045050, GS04875KG30225045063 - Found OK | OK |
| 17 | Auto Edge Trimming | Trimming Quality | 5 pieces<br>per shift | Excess layer from the glass edge should be removed,Uneven Trimming not allowed | Even Trim: -0.46mm deviation | — |
| | | Trimming Blade life cycle | once<br>per month | Worn out not allowed | Even Trim: 0.17mm deviation | Acceptable |

| | | | | | | |
|---|---|---|---|---|---|---|
| 18 | 90° Visual Inspection | Visual Inspection | 5 pieces<br>per shift | Post Lam Visual Inspection Criteria | S.No: GS04875KG30225045018, GS04875KG30225045043, GS04875KG30225045047, GS04875KG30225045060, GS04875KG30225045075 - Found OK | Clear |
| 19 | Framing | Glue uniformity & continuity in frame groove | 1 set<br>per shift | Should be uniform,Back sealing should be proper | As per spec | Pass |
| | | Short Side Glue Weight | once<br>Per shift | Till as per Specification | Refer Document GSPL/IPQC/QC/011 | — |
| | | Long Side Glue Weight | once<br>Per shift | | Refer Document GSPL/IPQC/QC/011 | Pass |
| | | Anodizing Thickness | once<br>Per shift | ≥15 micron | >15 micron (17.0 micron) | Pass |
| 20 | Junction Box Assembly | Junction Box(Connector Appearance & Cable Length) | once<br>Per shift | As per Process Card & module drawing | JB Position: 0.23mm shift | As per spec |
| | | Silicon Glue Weight on the bottom (g) | once<br>Per shift | 21±6 gm | Refer Document GSPL/IPQC/QC/011 | Pass |
| | | Max Welding time | once<br>Per shift | As per Specification | As per spec | No defects |
| 21 | Auto JB Soldering | Soldering current | once<br>per shift | As per Specification | 21.5A | OK |
| | | Soldering Quality | once<br>per shift | Welding area should be fully covered & checked by twizzer,no yellowing allowed | OK, OK, OK | — |
| 22 | JB Potting | A/B Glue Ratio | once<br>Per shift | As per Specification | As per spec | Pass |
| | | Potting material weight | once<br>Per shift | 21±6 gm | EPE304 | Verified |
| | | Nozzle Changing | once<br>every 6h | Should be changed after 6 hours or when found issue of damage or extra amount dispensing. | As per spec | Good |
| 23 | OLE Potting Inspection (If Applicable) | Visual Check | once<br>5 piece | Potting should be properly filled, and mounting hole should be as per drawing. | S.No: GS04875KG30225045006, GS04875KG30225045008, GS04875KG30225045032, GS04875KG30225045077, GS04875KG30225045084 - OK | Good |
| 24 | Curing | Temperature | once<br>per shift | 25±3■ | Time: 08:00 - Temp: 22.52°C | OK |
| | | Humidity | once<br>per shift | ≤50% | Time: 08:00 - RH: 49% | Stable |
| | | Curing Time(H) | once<br>Per shift | ≥4 hours | >4 hr (5.8 hr) | Good |

| | | | | | | |
|---|---|---|---|---|---|---|
| 25 | Buffing | Corner Edge-Buffing belt condition | 5 pieces per shift | Should not be sharp & No worn out | S.No: GS04875KG30225045016, GS04875KG30225045025, GS04875KG30225045035, GS04875KG30225045042, GS04875KG30225045095 - OK | No defects |
| 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: GS04875KG30225045037, GS04875KG30225045042, GS04875KG30225045047, GS04875KG30225045059, GS04875KG30225045064 | Good |
| 27 | Flash Tester | Ambient Temp. | once per shift | 25±3■ | Time: 08:00 - Temp: 26.41°C | — |
| | | Module Temp. | once per shift | 25±3■ | Time: 08:00 - Temp: 22.93°C | Acceptable |
| | | 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, Golden Module: GM-2024-001 | Pass |
| | | Validation | once every 4h | As per GSEN/QA/K/11 | As per spec | Pass |
| | | Silver Reference Module Iv Check | once Two weeks | Should be same as original I-v picture | EL - OK | Good |
| 28 | Hipot Test | DCW/IR/Ground continuity | 5 pieces per shift | ≤50µA , >40MΩ·m² , (0-100) mΩ | GS04875KG30225045072: DCW=19.4µA, IR=91.1MΩ, GND=15.4mΩ \| GS04875KG30225045035: DCW=29.6µA, IR=57.2MΩ, GND=23.4mΩ \| GS04875KG30225045006: DCW=17.5µA, IR=56.3MΩ, GND=44.3mΩ \| GS04875KG30225045093: DCW=14.8µA, IR=55.4MΩ, GND=18.5mΩ \| GS04875KG30225045030: DCW=32.6µA, IR=119.5MΩ, GND=30.0mΩ | Good |
| 29 | Post EL Test | Verification of current configuration in DC power supply | once Shift | As per WI (GSPL/P/WI/027) | Pmax: 626.3W | OK |
| | | EL Inspection and Visual Inspection | 5 pieces per shift | Post EL Inspection Criteria, Post EL Visual Criteria | S.No: GS04875KG30225045029, GS04875KG30225045048, GS04875KG30225045072, GS04875KG30225045091, GS04875KG30225045097 - Found OK | No defects |
| 30 | RFID | RFID Position | once per shift | As per Process card | Center, Center, Center | OK |
| | | Cell & Module Make & Manufacturing Month Verification | once per shift | As per BOM and Process card | As per spec | OK |

| | | | | | | |
|---|---|---|---|---|---|---|
| 31 | Final Visual Inspection | Visual Inspection | 5 pieces per shift | Post lam visual inspection criteria | S.No: GS04875KG30225045001, GS04875KG30225045040, GS04875KG30225045065, GS04875KG30225045081, GS04875KG30225045090 - Found OK | Pass |
| | | Re-label | 5 pieces per shift | No bubble,Tilt,Align,no folded label not acceptable | S.No: GS04875KG30225045018, GS04875KG30225045030, GS04875KG30225045040, GS04875KG30225045052, GS04875KG30225045076 - Found OK | No defects |
| 32 | Dimension measurement | L*W and Module Profile | once per shift | As per Module drawing (±1mm) | 2382mm x 1134mm x 30mm | Pass |
| | | Mounting Hole X & Y (H/L) | once Per shift | | 1400mm x 1091mm | OK |
| | | Diagonal Difference | once Per shift | ≤3mm | FF: 78.02% | Acceptable |
| | | Corner Gap | once Per shift | As per visual inspection criteria | 0.03mm | Acceptable |
| | | JB Cable length | once Per shift | As per Process Card | 1200mm | As per spec |
| 33 | Packaging | Packaging Label | once Per shift | WI For Packaging | Tilt: 0.75mm | Pass |
| | | Content in Box | once Per shift | | As per spec | Good |
| | | 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 | 2386mm x 1019mm x 146mm | Within tolerance |