



Gautam Solar Private Limited

Document No.

GSPL/PLV/001

Issue Date

01-12-2024

Rev. No.

00

Page

Page 1 of 8

Document Title: IPQC
Type Of Document: Pre-Lamination Visual acceptance Criteria

Purpose: The purpose of this document is to describe the visual acceptance criteria for PV module.

Defect Classification for Visual Inspection of Modules:

Defects detected during inspection are classified in three different categories as follows:

- **Critical (Cr):** A latent or overt defect that is likely to result in a hazardous or unsafe condition for the individual using the Module, contravenes mandatory regulations and/or may cause damage to other products or property.
- **Major (Ma):** A latent or overt defect that could impair the usability or result in under-performance or premature failure of the module.
- **Minor (Mi):** A latent or overt defect that does not impair the usability of the PV module, but is nevertheless considered a workmanship defect beyond normal, acceptable quality standards. This includes obvious visual defects. Any Modules with purely minor defects will not be cause for rejection.

VISUAL INSPECTION Method”

DURATION Visual inspection time is approximately 30 seconds per module.

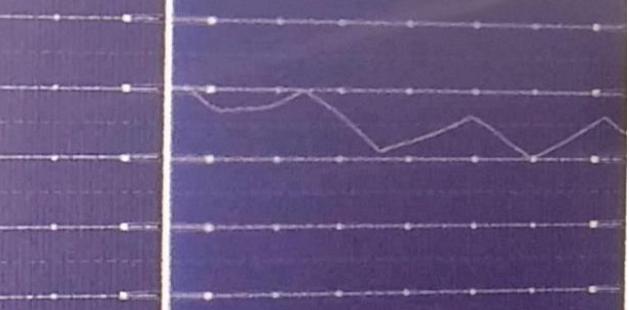
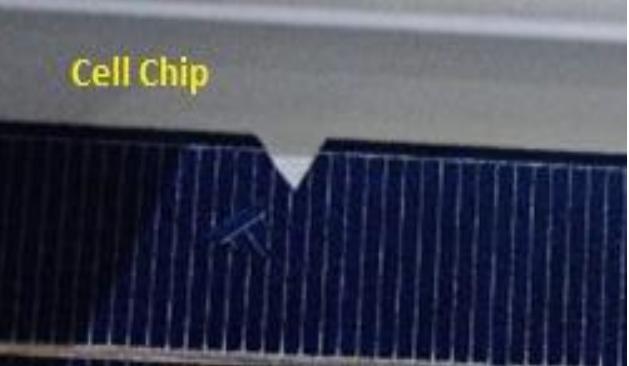
ENVIRONMENT The ambient temperature should be $25 \pm 3^{\circ}\text{C}$.

DISTANCE The module should be inspected at a distance of 1m to the eyes

1) Solar Cells (Front or back)

Prepared By:	Approved By:	Documents Status
		CONTROL COPY

CONTROL COPY

S.NO	VISUAL INSPECTION PARAMETER	DEFECT CODE	DEFECT CLASS	DEFECT REPRESENTATION	DEFECT DESCRIPTION	ACCEPTANCE CRITERION
1	Cell Crack	1	Critical		Any crack visible by naked eye without magnification or backlight	Not Allowed
2	Cell chip	2	Major		U chip / V chip or any other chip in cell extending to grid line	V chip: Not allowed U Chip: Length ≤ 2 mm is allowed maximum 1 chip per cell and 2 per module

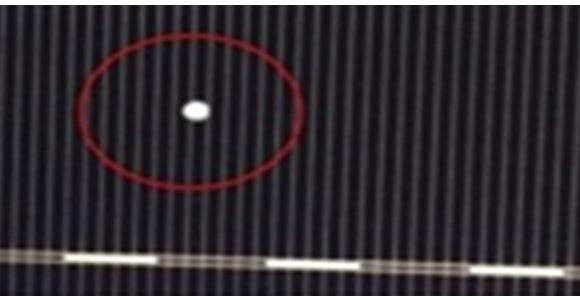
S.NO	VISUAL INSPECTION PARAMETER	DEFECT CODE	DEFECT CLASS	DEFECT REPRESENTATION	DEFECT DESCRIPTION	ACCEPTANCE CRITERION
------	-----------------------------	-------------	--------------	-----------------------	--------------------	----------------------

Prepared By:	Approved By:	Documents Status
		CONTROL COPY

3	Cell Scratch	3	Minor	 Cell Scratch	Any scratch on cell visible by naked eye but not affecting the cell integrity or printing	The Length of the scratch should be ≤ 50 mm and not visible from 1m Distance. Qty Allowed: 2 Per Module.
4	Finger Interruptions	4	Minor	 Finger Interruption	Grid line missing in solar cells	Length should be ≤ 2mm Qty Allowed: 4 within a cell & 3 such cells in a module.
5	Pin Hole in cell	5	Minor	NA	Visible hole in cell	Not Allowed

S.NO	VISUAL INSPECTION PARAMETER	DEFECT CODE	DEFECT CLASS	DEFECT REPRESENTATION	DEFECT DESCRIPTION	ACCEPTANCE CRITERION
------	-----------------------------	-------------	--------------	-----------------------	--------------------	----------------------

Prepared By:	Approved By:	Documents Status
		CONTROL COPY



The cells shall be clean and free of stain, smear and smudge

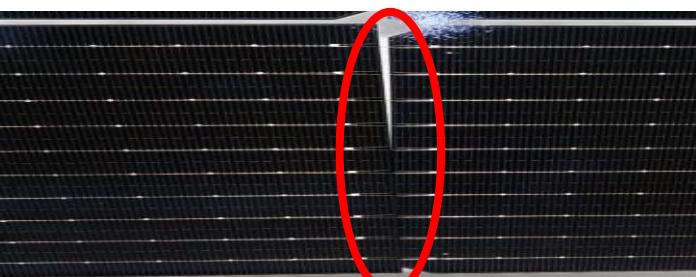
Non-Conforming if: if area of stain is > 1 mm²

Quantity Allowed: one cell per module.



Colour Difference Between Cells

Minor Colour Mismatch allowed from Viewing Distance 1 m.

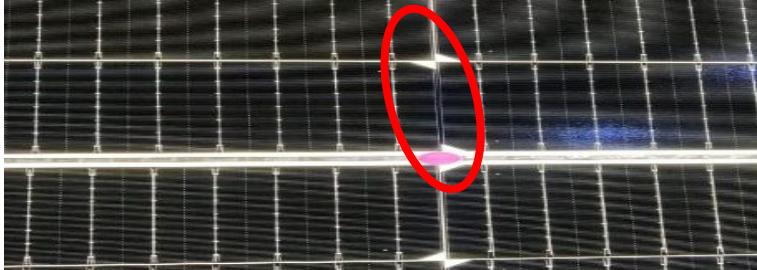
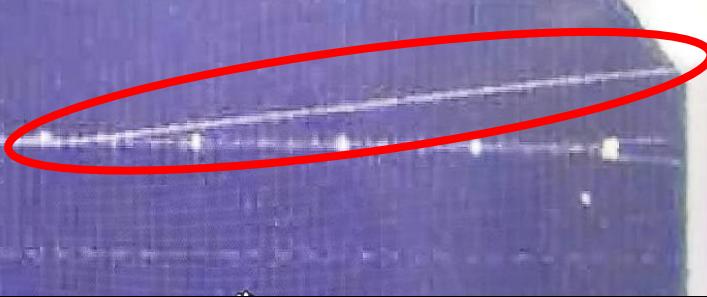
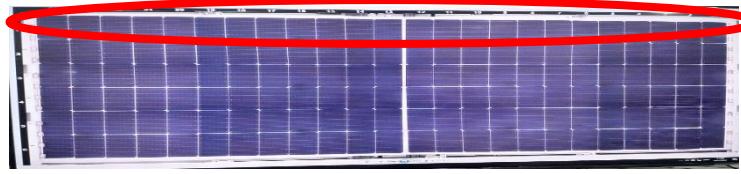


The gap between cell to cell should be maintained

$0.8 \pm 0.5\text{mm}$ or it should comply to the Safety standard IEC 61730-1.

S.NO	VISUAL INSPECTION PARAMETER	DEFECT CODE	DEFECT CLASS	DEFECT REPRESENTATION	DEFECT DESCRIPTION	ACCEPTANCE CRITERION
6	Paste Stain on cell	6	Minor		The cells shall be clean and free of stain, smear and smudge	Non-Conforming if: if area of stain is > 1 mm ² Quantity Allowed: one cell per module.
7	Colour Variation	7	Minor		Colour Difference Between Cells	Minor Colour Mismatch allowed from Viewing Distance 1 m.
8	Cell to Cell Gap	8	Minor		The gap between cell to cell should be maintained	$0.8 \pm 0.5\text{mm}$ or it should comply to the Safety standard IEC 61730-1.

Prepared By:	Approved By:	Documents Status
		CONTROL COPY

S.NO	VISUAL INSPECTION PARAMETER	DEFECT CODE	DEFECT CLASS	DEFECT REPRESENTATION	DEFECT DESCRIPTION	ACCEPTANCE CRITERION
9	String to String Gap	9	Minor		The gap between string to string should be maintained	Minimum gap should be 1 mm or it should comply to the safety standard IEC 61730-1
10	Front Tabbing/Ribbon Misalignment	10	Minor		Misalignment of solar ribbon taper or parallel shifting ribbon twist, ribbon bend from front or back side of cells.	For MBB: The distance of deviation allowed is ≤ 4 mm. Qty Allowed: 6 cells in a module.
11	String misalignment from side edge of module (Matrix Shift)	11	Major		String Should be straight on Glass.	Not Allowed

Prepared By:

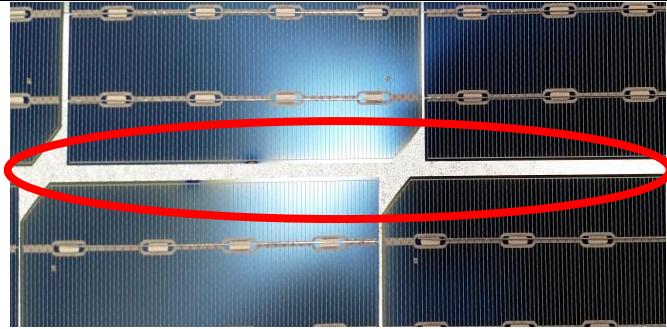
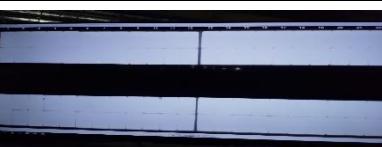
Approved By:

Documents Status

CONTROL COPY

Document Title: IPQC

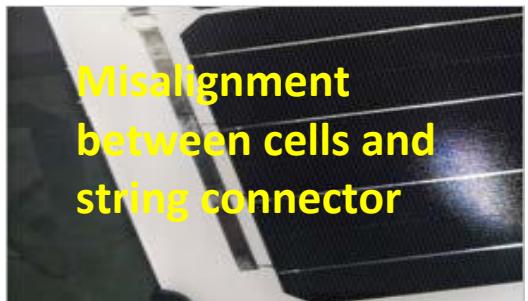
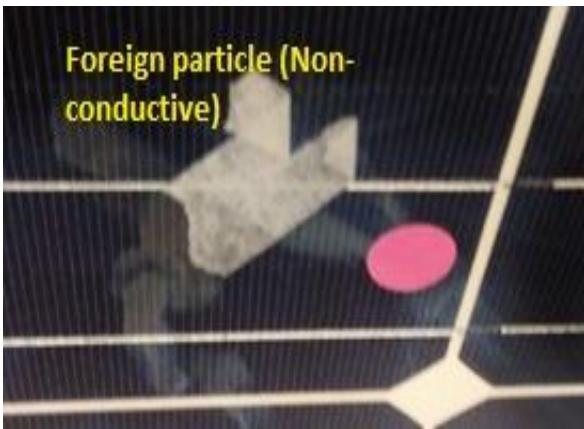
Type Of Document: Pre-Lamination Visual acceptance Criteria

12	Gap between cell edge & interconnect	12	Major		Gapping between interconnect and cell	The Distance between Cell edge and interconnect should be ≥ 2 mm.
13	String Offset	13	Minor		Misalignment between Strings	Non-conforming if minimum creepage and clearance distances are not met.
14	Offset of Cell/cell Location	14	Minor	NA	Cells are misaligned to each other in both Horizontal and Vertical directions	Non-conforming if minimum creepage and clearance distances are not met.
15	L cone Short	15	Critical	 	When there is contact between short L and long L inter connector	Not Allowed

S.NO	VISUAL INSPECTION PARAMETER	DEFECT CODE	DEFECT CLASS	DEFECT REPRESENTATION	DEFECT DESCRIPTION	ACCEPTANCE CRITERION
Prepared By:			Approved By:			Documents Status
						CONTROL COPY

Document Title: IPQC

Type Of Document: Pre-Lamination Visual acceptance Criteria

16	Mis-Alignment between Cell and String Connector (Cross-Tie)	16	Minor	 Misalignment between cells and string connector	There should be no misalignment between cell and string connector	For MBB : Misalignment length (L)<1mm: ignored Between 1≤the misalignment length (L)<3mm. Quantity Allowed: 18 per module
17 (i)	Foreign particle (Nonconductive)	17 (N)	Minor	 Foreign particle (Non-conductive)	(Back sheet flakes, fibber, insect, dust, gloves piece, tape and any other foreign particle which is not conductive)	Not allowed
S.NO	VISUAL INSPECTION PARAMETER	DEFECT CODE	DEFECT CLASS	DEFECT REPRESENTATION	DEFECT DESCRIPTION	ACCEPTANCE CRITERION

Prepared By:

Approved By:

Documents Status

CONTROL COPY

Document Title: IPQC

Type Of Document: Pre-Lamination Visual acceptance Criteria

17 (ii)	Foreign particle (Conductive)	17 (C)	Major		(hair, solder bids, ribbon pieces & cell pieces)	Not Allowed
------------	----------------------------------	--------	-------	--	--	-------------

Prepared By:

Approved By:

Documents Status

CONTROL COPY