REVISION HISTORY			
REV	**Description of Change**	**Author**	**Effective Date**
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REFERENCE DOCUMENTS	
Document Number	**Document Title**

Documents referenced in this specification are applicable to the extent specified herein.

1.0 TABLE OF CONTENTS

2.0. OBJECTIVE

To provide a standardized photovoltaic (PV) solar panel specification. The PV solar panels are to form part of the site power infrastructure and shall be type suited to allow for ease of integration and scalability.

3.0. GENERAL REQUIREMENTS

3.1. Operating conditions: All PV solar panels shall be designed to operate in sub-tropical conditions and shall be TUV Rheinland certified.

3.2. PV solar panel characteristics:

- 3.2.1. Poly-crystalline or mono-crystalline,
- 3.2.2. Single sided technology or bi-facial solar panels on request,
- 3.2.3. 60 or 72 cell depending on the application,
- 3.2.4. Minimum of five (5) busbars per solar cell.

3.3. PV solar panel frames as per dimensions stipulated herein shall allow for fastening onto a structure to ensure the PV solar panels can be secured onto the structure for mounting and security purposes.

3.4. High module durability achieved through tempered glass.

3.5. Resistance to saline, acid, alkali and sand corrosion.

3.6. PID (Potential Induced Degradation) resistant.

3.7. PERC (Passivated Emitter Rear Contact) cell technology.

3.8. Product Warranty: each PV solar panel will carry a ten (10) year product warranty.

3.9. Performance Warranty: linear power degradation from 100% to 80% capacity over a twenty five (25) year period.

3.10. The PV solar panel manufacturer must have support (hold stock and ensure warranty claims are honoured) either directly or through a partner in the country of intended supply and installation.

4.0. STANDARDS AND CERTIFICATION

4.1. The characteristics of solar panels supplied to ATC shall comply with the following international standards:

- 4.1.1. IEC 61215: Terrestrial photovoltaic (PV) modules – Design qualifications and type approval.
- 4.1.2. IEC 61730: Photovoltaic (PV) module safety qualification.
- 4.1.3. IEC 61701: Salt mist corrosion testing of photovoltaic (PV) modules.
- 4.1.4. ISO 9001: Quality Management Systems.
- 4.1.5. ISO 14001: Environmental Management Systems.

4.2. The solar panels must be certified as per TUV Rheinland or an equivalent certification authority.

5.0. TECHNICAL REQUIREMENTS

5.1. PV solar panel dimensions

5.1.1. Dimensions for PV solar panels should not exceed:

5.1.1.1. Length: 2100 mm

5.1.1.2. Width: 1000 mm

5.1.1.3. Height : 50 mm (excluding junction box, including frame thickness)

5.2. Operating Temperature: - 40°C to + 85°C

5.3. Frame material: Anodized aluminium, drain holes to be provisioned for adequate drainage.

5.4. Wind loading withstand: 2400 Pa (Pascals) front and back.

5.5. Module Fire Performance: Class C (IEC 61730).

5.6. Protection level: IP67 required on the junction box.

5.7. Cables: Photovoltaic technology cables 4 mm^2 cross sectional area at 1000 mm length each.

5.8. Connectors: Standard MC4.

5.9. No of Cells: 60 or 72 Cells per PV solar panel.

5.10. Half cell technology is preferred to reduce cell to module losses and the effects of shadowing.

5.11. Efficiency: PV solar panel/module conversion efficiency of greater than 16.5% for poly-crystalline PV solar panels and 17.5% for mono-crystalline solar panels.

5.12. PV solar panel peak power, under standard test conditions (STC):

5.12.1. From 290 Watts Peak (Wp) to 330 Wp for 60 cell solar panels,

5.12.2. From 320 Wp to 370 Wp for 72 cell solar panels.

5.13. Metal Wrap Through (MWT) technology or shingled distribution architecture preferred over standard distribution systems.

5.14. The PV solar systems will be designed to support high charging voltages. The PV solar panels to handle up to 1000V Direct Current (DC) in series string configuration.

5.15. DuPontTM Tedlar® backsheet.

6.0. APPENDIX A: COMPLIANCE TABLE

6.1. The vendor is required to complete the compliance statement for each of the PV solar panels proposed.