Annex 22
Technical Acceptance

Macao Solar Installation

REVISION HISTORY

Revision Level	Change Summary	Elaborated by	Approved by	Date

Digitally signed by julie.baudry@trinasolar.com
DN: cn=julie.baudry@trinasolar.com
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Annex 22 – Technical Acceptance Inspection (TAI)

1 Introduction

Within ten (10) business days after receipt of the Mechanical Completion notice, together with all associated documents (listed in Annex 9), the Works Director, Contractor's Representative, Owner's Representative and, if applicable, the Independent Technical Advisor will meet to perform the Technical Acceptance Inspection.

During the Technical Acceptance Inspection the team will verify that

- All components, materials and equipment are free from any damage which could affect the safety and operation of the Solar Park and/or personnel,
- The installed components, materials and equipment meet the agreed technical specifications and are suitably rated for the long term operation of the Solar Park,
- The installation of all the components and equipment meet the requirements from every manufacturer,
- The installation and associated labelling is compliant with the Applicable Laws and Standards,
- The equipment has been installed in accordance with the specifications.

On completion of the inspection the findings will be compiled, signed and distributed between the parties and, if acceptable, a Technical Acceptance Certificate will be issued. Minor defects or omissions will either be waived or included in a punch list but major deficiencies will need to be rectified immediately.

2 Visual Inspection and Mechanical Tests

Verify that the site is fully compliant with the permitted design including all conditions precedent.

2.1 Solar Modules

Check that:

- The solar modules are free of visible damage signs.
- Solar module fixing method is in accordance with manufacturer's installation manual.
- The tightening torque (or spring force) applied to the screws fixing the clamps is in accordance with the manufacturer recommendations.

2.2 Solar Module Mounting Structures.

Verify that:

- The height (maximum and minimum) and tilt angle of the completed module table are in accordance with the design.
- The inter row spacing and the spacing between solar module tables and the cabins and fences is in accordance with the design.
- The tables are flat and without visual misalignments.
- All structure's metal parts are correctly connected to earth.
- Verify the galvanising certificates and pull out tests results are appropriate for the site.
- Inspect the structure for signs of damage or corrosion, inspect welds and verify that appropriate measures have been taken to prevent localised corrosion as a result of dissimilar metals.

2.3 DC Wiring

Verify that:

- All cables are properly protected from external effects such as sunlight, rain, wind, humidity, animals, insects, grazing & farming.
- The module interconnecting cables are adequately secured and supported to ensure long-term reliability.
- Entries to all underground conduits are sealed to prevent entry of animals & rodents.
- Cable types and sizes are in accordance with specification and drawings.
- All cabling, except inter-module cables, are labelled and that the labels will withstand long term exposure to the elements.
- The DC cable insulation is rated at 1500V or greater and has a temperature rating of at least 70°C.
- The minimum bend radius of the cables is in compliance with the manufacture's manual specifications.
- The correct connectors have been used and installed correctly.

2.4 String boxes

Verify that:

- The string boxes are mounted appropriately to en sure that the ingress protection will be maintained, cables glands (as appropriate) are well sealed and plug and socket connectors are properly closed (latches engaged).
- The distance between the ground and bottom of enclosure is adequate.
- Suitably rated fuses are fitted in each non-earthed pole.
- Terminal polarities are clearly and permanently marked.
- All string boxes carry a warning label, in English, indicating that active parts inside the boxes are fed from a PV array and may still be live after isolation from the PV inverter and public supply.
- Every string box has a permanent ID label in accordance with the as built drawings.

2.5 Inverter

Verify that:

- The inverter has been installed in accordance with the manufacturer's instructions.
- The installation meets the minimal spacing, venting and related requirements.
- The DC isolation switch is easily identified, clearly marked and can be locked off during maintenance.
- All inverter housings are labelled in accordance with the as-built drawings and additionally carry a warning label, in English, indicating that hazardous voltages may be present even after isolation of the DC switch or the public supply.
- The inverter housings have been undamaged during transportation and installation.
- The foundations have not been damaged and are correctly installed.
- There are adequate drainage measures in place.
- The foundations are properly backfilled to prevent water and rodent intrusion.

2.6 Transformer

- Check that the transformer has been installed in accordance with manufacturer's instructions
- Verify that the connections are tight and that the transformer has adequate ventilation.
- If an oil transformer is used then check for signs of oil spills below.
- Ensure that the product rating and emergency contact details are clearly displayed,
- Verify that the enclosure is in accordance with the specifications, transformers that are not within a housing should be fenced with an access gate provided
- Verify that the transformers are adequately labelled.

2.7 Switch gear

- Check the proper installations of the switch gear, their connections,
- Verify that the compartment is clean and free of humidity
- Verify that a single line diagram is available and true to the equipment installed

2.8 MV Cables

- Verify that cable conduits are adequately sealed.

2.9 Earthing

- Check the specifications of the grounding devices (size of the earthing rod, cable sections and resistance) and installation.

2.10 Customer & DNO Building

- Check any remedy works required by the DNO and verify that the action plan to rectify this is adequate

2.11 Access & Internal Roads

- Carry out above-ground visual inspection to verify that access and internal roads have been implemented according to technical specifications

2.12 Gates & Fences

- There are no gaps in fencing system (other than mammal gaps),
- The locking mechanism for all security gates works correctly,

3 Labelling and Signage

Verify that

- Signage stating the potential hazards and emergency numbers are installed at each site entrance.
- All signs and labels are UV stable, durable and are permanently affixed,
- The following paper copies of latest documents are available on site
  - Single Line diagram.
  - General Layout.
- The relevant drawings for each string/combiner box (electrical connection and communications) are provided inside each string/combiner box.