

# EXPRESSION OF INTEREST FOR SUPPLY OF SOLAR PHOTOVOLTAIC (PV) MODULES (INCLUDING CELLS MANUFACTURED IN INDIA)

Solar Energy Corporation of India

Document No.: SECI/C&P/EoI/.....

dated 28-12-2021

## Expression of Interest for Manufacturing and Supply of Solar PV Modules with DCR



### **Disclaimer:**

#### **Prospective respondent (Applicants) to this EOI acknowledges and agrees that:**

- Solar Energy Corporation of India Limited (SECI) has issued this Expression of Interest with the best intention to explore the market for eligible and interested bidders and has no compulsions to enter into definitive contractual agreements. This EOI does not guarantee conversion of this EOI into any definitive contractual agreements.
- It is also agreed that SECI in its sole discretion, may reject any and all proposals made by respondent(s), may change the conditions relating to the EOI or cancel this EOI at any time without assigning any reason.
- Prospective respondent(s) acknowledge and agree that response to the EOI is purely voluntary action on their part and for any expenditure on this account shall be borne by the respondent(s).
- SECI will have no obligation or liability to the respondent(s) in the event of cancellation of EOI.

**Note: Applicants are requested to keep themselves updated with the website [www.seci.co.in](http://www.seci.co.in) on regular basis for any addition / deletion / modification / clarification or notification in respect of this, at EOI stage and at bidding stage. No separate notification will be issued in any other media.**

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### 1. About SECI:

SECI, under the administrative control of Ministry of New and Renewable Energy (MNRE) was established in the year 2011 with the mission to build a 'Green India' through harnessing abundant solar radiation and wind resource, thereby achieving energy security for the country. SECI is the implementing agency for various schemes for the development of solar, wind and hybrid power. As of December 2021, SECI has successfully awarded over 50 GW of renewable capacity across the country, out of which 32.69 GW is solar power, 12.73 GW is wind power and 5.35 GW is hybrid power under various schemes. SECI, having technical expertise, is also providing Project Management Consultancy (PMC) services to various government and non-government organizations for setting up of Solar and Wind Power Projects. In addition to these, SECI has operational CAPEX projects of 21 MW capacity under its ownership and the company is looking to expand its portfolio in renewable energy. SECI also has a Category I Trading License from Central Electricity Regulatory Commission (CERC) to carry out power trading on pan-India basis.

### 2. Background of EoI

India is home to one of the world's largest renewable energy programs, with a target of 175 GW of installed renewable energy capacity by 2022. Recently, the Prime Minister has also pledged to increase the country's renewable energy capacity to constitute 500 GW of the country's installed capacity by 2030, which would meet 50% of the country's energy demand.

To support local manufacturing, GoI brought out CPSU scheme, where in CPSUs can develop the solar projects under the scheme, with a condition that the solar PV modules used shall be made in India including the solar cell used in the same. Recently SECI was awarded with a capacity of 1200 MW under CPSU Scheme II (Tranche III) for which SECI is in the process of executing the projects. SECI is planning to procure the modules for the projects directly from the manufacturers.

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To assess the availability of modules along with commercial parameter, SECI intends to invite Expression of Interest from Solar PV Cell and Module Manufacturers for supply of PV Modules.

The preliminary details on the Technical Specifications of PV Modules and the General Conditions of Contract, Quality inspection criteria are provided herewith for the reference purpose.

Based on the requirements, SECI will invite the bids for supply of modules among the PV Manufacturers based on the inputs received from this EoI.

### 3. Scope of Work

Supplier shall be responsible for the manufacture and supply of the PV Modules as per the following:

Description	Value
DC Capacity of Modules	1800 MWp
Technical Specifications ( Reference)	As per Annexure III
Mode of Dispatch	Road
Supply Conditions ( reference)	As per Annexure II (General Conditions of Contract)
Domestic Consumption Requirement (DCR)	Both Solar Photovoltaic (SPV) cells and Modules manufactured domestically as per specifications and testing requirement fixed by MNRE
Delivery Period	FY 2023-24

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**4. Submission of EoI**

- Interested PV Module Manufacturers are required to submit the response with the complete information in all respects as per enclosed format (Refer *Annexures-I*). The furnished information shall be supported with relevant documents if any.
- Prospective parties may submit their ‘Expression of Interest’ duly signed by the authorized signatory along with relevant details as sought in the data sheets latest by **21<sup>st</sup> January 2022, till 17:30 hrs.** in a sealed cover super scribing “**Expression of Interest for Supply of Photovoltaic (PV) Modules**”, to

**Dr Y.B.K Reddy**  
**Additional General Manager (Power Systems)**  
Solar Energy Corporation of India Limited,  
6<sup>th</sup> Floor, Plate B, Office Block-2  
NBCC Building, East Kidwai Nagar,  
New Delhi-110023

For any clarification, you are requested to contact 011-24666-218/238 or Email to [ybkreddy@seci.co.in](mailto:ybkreddy@seci.co.in), [prashantu@seci.co.in](mailto:prashantu@seci.co.in)

The date of any discussion meeting after receipt of EOIs, will be informed to the respondents by e-mail / through SECI website.



**Annexure - I**  
**EoI SUBMISSION FORMAT**

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**Annexure III: EoI Submission Format**

<b>Bidder Company Details</b>		
<b>S. No.</b>	<b>Parameters</b>	<b>Details</b>
i.	Name of the Company	
ii.	Authorized Contact Person with Name, Designation, Address, Contact Number, Email Address (To whom all references should be made)	
iii.	Year of Incorporation	
iv.	Number of Years in Operation / New Company	
v.	Whether registered under the Companies Act 1956 / the Companies Act 2013 ?	
vi.	Permanent/Registered Address and Contact Information	
vii.	Factory/Works Address(es) and Contact Information	
viii.	Mailing Address	
ix.	Whether debarred from executing works by any PSU/Ministry/Govt. Dept?	
x.	Whether Manufacturing Facility has ISO 9001 Quality Management System (QMS) and ISO 14001 Environmental Management System (EMS)?	

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xi.	Whether Company is Class-I local supplier as per MNRE Order dated 23 <sup>rd</sup> Sep, 2020 on Public Procurement?	
xii.	Total PV Cell and Module Manufacturing Capacity as on date (Throughput capacity) in GW	
xiii.	Total intended PV Cell and Module Manufacturing Capacity as on date (Throughput capacity) in GW by June 2023	
xiv.	Total PV Module Cumulative Capacity supplied as on date	

**Manufacturing Capacity and Supply Plan**

<b>Period</b>	<b>Supply Quantity (MW)</b>	<b>Ex Works Price/Wp</b>	<b>Firm/Tentative (Yes/No)</b>	<b>Proposed Technology (Mono/Poly Si/Thinfilm)</b>
Q3-2023				
Q4-2023				



**Annexure - II**  
**GENERAL CONDITIONS OF  
CONTRACT**

## Expression of Interest for Manufacturing and Supply of Solar PV Modules with DCR



### General

1. These 'General Commercial Conditions for Contract for Purchase' hereinafter referred to as GCC apply to all enquiries, tenders, requests for quotations, orders, contracts and agreements concerning the supply of goods and the rendering of related services (hereinafter referred to as "deliveries") to Solar Energy Corporation of India and any of its units, regions or divisions (hereinafter referred to as "SECI" or the Purchaser) or its projects / customers.
2. Any deviations from or additions to these GCC require SECI's express written consent. The general terms of business or sale of the Supplier shall not apply to SECI. Acceptance, receipt of shipments or services or effecting payment shall not mean that the general terms of business or sale of the Supplier have been accepted.
3. Orders, agreements and amendments thereto shall be binding if made or confirmed by SECI in writing. Only the Purchasing department of SECI is authorized to issue the Purchase Order or any amendment thereof.

### Definitions:

Throughout these conditions and in the specifications, the following terms shall have the meanings assigned to them, unless the subject matter or the context requires otherwise.

**'The Purchaser'** means Solar Energy Corporation of India (A Govt. of India Undertaking) having its registered office at SECI, Plate B, 6<sup>th</sup> Floor, Office Block 2, NBCC Building, East Kidwai Nagar, New Delhi-110023, India and shall be deemed to include its successors and assigns. It may also be referred to as SECI.

**'The Supplier'** means the person, firm, company or organization on whom the Purchase Order is placed and shall be deemed to include the Supplier's successors, representative heirs, executors and administrator as the case may be. It may also be referred to as Seller, Contractor or Supplier.

**'Contract'** shall mean and include the Purchase Order incorporating various agreements, viz. tender/ RFQ, offer, letter of intent / acceptance / award, the General Conditions of Contract and

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Special Conditions of Contract for Purchase, Specifications, Inspection / Quality Plan, Schedule of Prices and Quantities, Drawings, if any enclosed or to be provided by SECI or his authorized nominee and the samples or patterns if any to be provided under the provisions of the contract.

**‘Parties to the Contract’** shall mean the ‘The Supplier’ and the Purchaser as named in the main body of the Purchase Order.

**“Bidder”** shall mean duly established reputed organisation, manufacturer etc. having requisite financial and technical capability and experience of participating in the bid invited by the purchaser for the tender.

**‘Bid’** - The term “bid” or “bidding” can also relate to the documented Offer submitted in response to a request for quotation (RFQ) /Tender.

**Interpretation:**

In the contract, except where the context requires otherwise:

- i. words indicating one gender include all genders;
- ii. words indicating the singular also include the plural and words indicating the plural also include the singular;
- iii. provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing, and
- iv. "Written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

**Applicable Conditions:**

**Price Basis:** All prices shall be firm until the purchase order is executed / completed in all respects. No price variations / escalation shall be permitted unless otherwise such variations / escalations are provided for and agreed by SECI in writing in the purchase order.

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**Validity:** The offer will be valid for a period of 90 days from the date of technical bid opening date. Validity beyond 90 days, if required, will be specified in the SCC (special conditions of contract).

**Ordering and confirmation of Order:** Supplier shall send the order acceptance on their company letter head within two weeks from the date of Purchase Order or such other period as specified / agreed by SECI. SECI reserves the right to revoke the order placed if the order confirmation differs from the original order placed. The acceptance of goods/services/supplies by SECI as well as payments made in this regard shall not imply acceptance of any deviations.

The purchase order will be deemed to have been accepted if no communication to the contrary is received within two weeks (or the time limit as specified / agreed by SECI) from the date of the purchase order.

**Documentation:** After receipt of Purchase Order, Supplier should submit required documents like drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report , O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by SECI/Customer. At any stage within the contract period, the Supplier shall notify of any error, fault or other defect found in SECI's documents /specifications or any other items for reference. If and to the extent that (taking account of cost and time) any Supplier exercising due care would have discovered the error, fault or other defect when examining the documents/specifications before submitting the tender, the time for completion shall not be extended. However if errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the Supplier's documents, they shall be corrected at his cost, notwithstanding any consent or approval.

**Terms of Delivery:** Equipment shall be delivered on “DDP Project site” basis, inclusive of freight, packing, insurance & forwarding charges.

Packing shall be Road / Rail / Air / Sea worthy, best suitable for transshipment and to take care of transit damages. Smaller consignments can be dispatched through Courier services/ RPP with the prior approval of the purchasing Executive.

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Deviation for the delivery term, can be rejected at discretion of SECI.

**Penalty for delay in delivery:** In the event of delay in agreed contractual delivery as per Purchase Order, penalty @ 0.5 % (half percent ) per week or part thereof but limited to a max of 10% (ten percent) value of undelivered portion (basic material cost) will be applicable. Delivery will commence from the date of document approval by customer / SECI or date of issue of manufacturing clearance, whichever is later. The date for which Inspection call is issued by Supplier along with test certificates / test reports / Certificate of Conformance / calibration reports, as proof of completion of manufacturing will be treated as date of deemed delivery for penalty calculation. In the absence of furnishing such document indicated above as proof of completion of manufacturing along with inspection call, actual date of inspection will be considered as date of deemed delivery and SECI will not be responsible for delay in actual date of inspection.

Penalty for delayed documentation/delayed delivery, if applicable, shall be deducted at the time of first payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent) of the basic material value will be deducted.

**Contract variations (Increase or decrease in the scope of supply):** SECI may vary the contracted scope as per requirements at site. If Supplier is of the opinion that the variation has an effect on the agreed price or delivery period, SECI shall be informed of this immediately in writing along with technical details. Where unit rates are available in the Contract, the same shall be applied to such additional work. Supplier shall not perform additional work before SECI has issued written instructions / amendment to the Purchase Order to that effect. The work which the Supplier should have or could have anticipated in terms of delivering the service(s) and functionality (i.e.) as described in this agreement, or which is considered to be the result of an attributable error on the Supplier's part, shall not be considered additional work.

**Reverse Auction:** SECI will go for reverse auction and will follow REVERSE AUCTION PROCEDURE (ONLINE BIDDING ON NETWORK) before finalising the Purchase order on technically competent bidders.

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**Pre Shipment Inspection:** Prior written notice of at least 10 days shall be given along with internal test certificates / COC and applicable test certificates. Materials will be inspected by SECI or SECI nominated Third Party Inspection Agency (TPIA) or SECI authorized Inspection Agency or Consultant or jointly by SECI & Consultant. All tests have to be conducted as applicable in line with Predispatch Inspection Protocol furnished by SECI as Annexure I(A).

All costs related to inspections & re-inspections shall be borne by Supplier. Whether the Contract provides for tests on the premises of the Supplier or any of his Sub-contractor/s, Supplier shall be responsible to provide such assistance, labor, materials, electricity, fuels, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently. Cost of any type test or such other special tests shall be borne by SECI only if specifically agreed to in the purchase order.

**Transit Insurance:** Transit Insurance is in Supplier's scope for all Inclusive value or as specified in RFQ. For imported items with FOB / ex-Works terms contracts, SECI will provide Insurance.

**Packaging and dispatch:** The Seller shall package the goods safely and carefully and pack them suitably in all respects considering the peculiarity of the material for normal safe transport by Sea / Air / Rail / Road to its destination suitably protected against loss, damage, corrosion in transit and the effect of tropical salt laden atmosphere. The packages shall be provided with fixtures / hooks and sling marks as may be required for easy and safe handling. If any consignment needs special handling instruction, the same shall be clearly marked with standard symbols / instructions. Hazardous material should be notified as such and their packing, transportation and other protection must conform to relevant regulations.

The packing, shipping, storage and processing of the goods must comply with the prevailing legislation and regulations concerning safety, the environment and working conditions. Any Imported/Physical Exports items packed with raw / solid wood packing material should be treated as per ISPM – 15 (fumigation) and accompanied by Phytosanitary / Fumigation certificate. If safety information sheets (MSDS – Material Safety Data Sheet) exist for an item or the packaging, Supplier must provide this information without fail along with the consignment.

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Each package must be marked with Consignee name, Purchase order number, Package number, Gross weight and net weight, dimensions (L x B x H) and Seller's name. Packing list of goods inside each package with PO item number and quantity must also be fixed securely outside the box to indicate the contents of each box. Total number of packages in the consignment must also be indicated. Separate packing & identification of items should be as follows.

- Main Scope - All items must be tagged with part no. & item description.
- Commissioning spares - All items must be tagged with part no. & item description.
- Mandatory spares - All items must be tagged with part no. & item description.

**Assignment of Rights & Obligations; Subcontracting:** Supplier is not permitted to subcontract the delivery or any part thereof to third party or to assign the rights and obligations resulting from this agreement in whole or in part to third parties without prior written permission from SECI. Any permission or approval given by SECI shall, however, not absolve the Supplier of the responsibility of his obligations under the Contract.

**Progress report:** Supplier shall render such report as to the progress of work and in such form as may be called for by the concerned purchase officer from time to time. The submission and acceptance of such reports shall not prejudice the rights of SECI in any manner.

**Non-disclosure and Information Obligations:** Supplier shall provide with all necessary information pertaining to the goods as it could be of importance to SECI. Supplier shall not reveal confidential information that may be divulged by SECI to Supplier's employees not involved with the tender/ contract & its execution and delivery or to third parties, unless SECI has agreed to this in writing beforehand. Supplier shall not be entitled to use the SECI name in advertisements and other commercial publications without prior written permission from SECI.

**Cancellation / Termination of contract:** SECI shall have the right to completely or partially terminate the agreement by means of written notice to that effect. Termination of the Contract, for whatever reason, shall be without prejudice to the rights of the parties accrued under the Contract up to the time of termination.

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SECI shall have the right to cancel/foreclose the Order/ Contract, wholly or in part, in case it is constrained to do so, on account of any decline, diminution, curtailment or stoppage of the business.

**Shortages:** In the event of shortage on receipt of goods and/or on opening of packages at site, all such shortages shall be made good within a reasonable time that SECI may allow from such intimation and free of cost.

**Transit Damages:** In the event of receipt of goods in damaged condition or having found them so upon opening of packages at site, Supplier shall make good of all such damages within a reasonable time from such intimation by SECI.

**Remedial work:** Notwithstanding any previous test or certification, SECI may instruct the Supplier to remove and replace materials/goods or remove and re-execute works/services which are not in accordance with the purchase order. Similarly SECI may ask the Supplier to supply materials or to execute any services which are urgently required for any safety reasons, whether arising out of or because of an accident, unforeseeable event or otherwise. In such an event, Supplier shall provide such services within a reasonable time as specified by SECI.

**Indemnity Clause:** Supplier shall comply with all applicable safety regulations and take care for the safety of all persons involved. Supplier is fully responsible for the safety of its personnel or that of his subcontractor's men / property, during execution of the Purchase Order and related services. All statutory payments including PF, ESI or other related charges have to be borne by the Supplier. Supplier is fully responsible for ensuring that all legal compliances are followed in course of such employment.

**Product Information, Drawings and Documents:** Drawings, technical documents or other technical information received by Supplier from SECI or vice versa shall not, without the consent of the other party, be used for any other purpose than that for which they were provided. They may not, without the consent of the Disclosing party, otherwise be used or copied, reproduced, transmitted or communicated to third parties. All information and data contained in general product

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documentation, whether in electronic or any other form, are binding only to the extent that they are by reference expressly included in the contract.

Supplier, as per agreed date/s but not later than the date of delivery, provide free of charge information and drawings which are necessary to permit and enable SECI to erect, commission, operate and maintain the product. Such information and drawings shall be supplied in as many numbers of copies as may be agreed upon.

All intellectual properties, including designs, drawings and product information etc. exchanged during the formation and execution of the Contract shall continue to be the property of the disclosing party.

**Intellectual Property Rights, Licenses:** If any Patent, design, Trade mark or any other intellectual property rights apply to the delivery (goods / related service) or accompanying documentation shall be the exclusive property of the Supplier and SECI shall be entitled to the legal use thereof free of charge by means of a non- exclusive, worldwide, perpetual license. All intellectual property rights that arise during the execution of the Purchase Order/ contract for delivery by Supplier and/or by its employees or third parties involved by the Supplier for performance of the agreement shall belong to SECI. Supplier shall perform everything necessary to obtain or establish the above mentioned rights. The Supplier guarantees that the delivery does not infringe on any of the intellectual property rights of third parties. The Supplier shall do everything necessary to obtain or establish the alternate acceptable arrangement pending resolution of any (alleged) claims by third parties. The Supplier shall indemnify SECI against any (alleged) claims by third parties in this regard and shall reimburse SECI for any damages suffered as a result thereof.

**Force Majeure:** Notwithstanding anything contained in the purchase order or any other document relevant thereto, neither party shall be liable for any failure or delay in performance to the extent said failures or delays are caused by the “Act of God” and occurring without its fault or negligence, provided that, force majeure will apply only if the failure to perform could not be avoided by the exercise of due care and Supplier doing everything reasonably possible to resume its performance.

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A party affected by an event of force majeure which may include fire, tempest, floods, earthquake, riot, war, damage by aircraft etc., shall give the other party written notice, with full details as soon as possible and in any event not later than seven (7) calendar days of the occurrence of the cause relied upon. If force majeure applies, dates by which performance obligations are scheduled to be met will be extended for a period of time equal to the time lost due to any delay so caused.

Notwithstanding above provisions, in an event of Force Majeure, SECI reserves for itself the right to cancel the order/ contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of deliveries and other schedules.

**Guarantee / Warranty:** Wherever required, and so provided in the specifications / Purchaser Order, the Seller shall guarantee that the stores supplied shall comply with the specifications laid down, for materials, workmanship and performance. The guarantee / warranty period as described above shall apply afresh to replaced, repaired or re-executed parts of a delivery. Unless otherwise specifically provided in the Purchase Order, Supplier's liability shall be co terminus with the expiration of the applicable guarantee / warranty period.

**Limitation of Liability:** Supplier's liability towards this contract is limited to a maximum of 100% of the contract value and consequential damages are excluded. However the limits of liability will have no effect in cases of criminal negligence or wilful misconduct.

The total liability of Supplier for all claims arising out of or relating to the performance or breach of the Contract or use of any Products or Services or any order shall not exceed the total Contract price.

**Liability during guarantee / warranty:** Supplier shall arrange replacement / repair of all the defective materials/ services under its obligation under the guarantee / warranty period. The rejected goods shall be taken away by Supplier and replaced / repaired. In the event of the Supplier's failure to comply, SECI may take appropriate action including disposal of rejections and replenishment by any other sources at the cost and risk of the Supplier.

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In case, defects attributable to Supplier are detected during first time commissioning or use, Supplier shall be responsible for replacement / repair of the goods as required by SECI at Supplier's cost. In all such cases expiry of guarantee / warranty will not be applicable.

**Liability after guarantee / warranty period:** At the end of the guarantee / warranty, the Supplier's liability ceases except for latent defects (latent defects are defects / performance issues notices after the guarantee/ warranty has expired). The Contractor's liability for latent defects warranty for the plant and equipment including spares shall be limited to a period of six months from the end of the guarantee / as specified in RFQ.

**Compliance with Laws:** Supplier shall, in performing the contract, comply with all applicable laws. The Supplier shall make all remittances, give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the laws in relation to the execution and completion of the contract and for remedying of any defects; and the Contractor shall indemnify and hold SECI harmless against and from the consequences of any failure to do so.

**Settlement of Disputes:** Except as otherwise specifically provided in the Purchase Order, decision of SECI shall be binding on the Supplier with respect to all questions relating to the interpretation or meaning of the terms and conditions and instructions herein before mentioned and as to the completion of supplies/work/services, other questions, claim, right, matter or things whatsoever in any way arising out of or relating to the contract, instructions, orders or these conditions or otherwise concerning the supply or the execution or failure to execute the order, whether arising during the schedule of supply/work or after the completion or abandonment thereof. Any disputes or differences among the parties shall to the extent possible be settled amicably between the parties thereto, failing which the disputed issues shall be settled through arbitration. Supplier shall continue to perform the contract, pending settlement of dispute(s).

### **Arbitration & Conciliation Clause:**

In case of contractors/Suppliers /consultants other than Public Sector Enterprise (PSE) or a Government Department: The parties shall attempt to settle any disputes or difference arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights

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and liabilities of the parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract, or in connection with this contract through friendly discussions. In case no amicable settlement can be reached between the parties through such discussions, in respect of any dispute; then, either Party may, by a notice in writing to the other Party refer such dispute or difference to the sole arbitration of an arbitrator appointed by the Managing Director of SECI. Such Sole Arbitrator appointed, shall conduct the arbitration in English language.

The Arbitrator shall pass a reasoned award and the award of the Arbitration shall be final and binding upon the Parties. Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceedings under this clause. The seat of arbitration shall be Delhi. The cost of arbitration shall be borne as decided by the Arbitrator upon him entering the reference.

**Subject to the Arbitration Clause as above, the Courts at Delhi alone shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract.**

Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the parties shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and efficiency in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.

In case of Contract with contractors/Suppliers /consultants when they are a Public Sector Enterprise (PSE) or a Government Department: In the event of any dispute or difference relating to the interpretation and application of the provisions of the Contract, such dispute or difference shall be referred by either party for Arbitration to the Sole Arbitrator in the Department of Public Enterprises to be nominated by the Secretary to the Government of India in-charge of the Department of Public Enterprises. The Arbitration and Conciliation Act, 1996 shall not be applicable to arbitration under this clause. The award of the Arbitrator shall be binding upon the parties to the dispute, provided, however, any Party aggrieved by such Award may make further

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reference for setting aside or revision of the Award to the Law Secretary, Department of Legal Affairs, Ministry of Law and Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary or Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the Parties hereto finally and conclusively. The Parties to the dispute will share equally the cost of arbitration as intimated by the Arbitrator.’’

**Applicable Laws and Jurisdiction of Courts:** Prevailing Indian laws both substantive and procedural, including modifications thereto, shall govern the Contract. Subject to the conditions as aforesaid, the competent courts in DELHI alone shall have jurisdiction to consider over any matters touching upon this contract.

**General Terms:** That any non-exercise, forbearance or omission of any of the powers conferred on SECI and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents.

That the headings used in this agreement are for convenience of reference only.

That all notices etc., to be given under the Purchase order shall be in writing, type script or printed and if sent by registered post or by courier service to the address given in this document shall be deemed to have been served on the date when in the ordinary course, they would have been delivered to the addressee.

**Discovery of Fraudulent Practices by the Bidder:** If an agency is found to have indulged in corrupt/ fraudulent/ collusive/ coercive practices, the agency shall be banned for future business with Employer/ Owner.



**Annexure - III**  
**TECHNICAL SPECIFICATIONS**

## Expression of Interest for Manufacturing and Supply of Solar PV Modules with DCR



### Annexure - I: Technical Specifications

#### 1.1 Standards and Codes

Photovoltaic Modules shall comply with the specified edition of the following standards and codes.

Standard	Description
IS 14286 : Part 1 : 2019	Terrestrial photovoltaic (PV) modules - Design qualification and type approval: Part 1 test requirements (Second Revision)
IS 14286 : Part 1 : Sec 1 : 2019	Terrestrial photovoltaic (PV) modules - Design qualification and type approval: Part 1 test requirements: Sec 1 special requirements for testing of crystalline silicon photovoltaic (PV) modules (Second Revision)
IS 14286 : Part 1 : Sec 2 : 2019	Terrestrial photovoltaic (PV) modules - Design qualification and type approval: Part 1 test requirements: Sec 2 special requirements for testing of thin - Film Cadmium Telluride (CdTe) based photovoltaic (PV) modules (Second Revision)
IS/IEC 61730-1:2016 Ed.2	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
IS/IEC 61730-2:2016 Ed.2	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
IS/IEC 61701:2011 Ed.2	Salt mist corrosion testing of photovoltaic (PV) modules (Applicable for coastal and marine environment)
IS 16664 : 2018	Photovoltaic (PV) Modules- Ammonia Corrosion Testing (if applicable)
IS 17210 : Part 1 : 2019	Photovoltaic (PV) Modules - Test Methods for the Detection of Potential-Induced Degradation - Part 1 - Crystalline Silicon (under conditions of 85°C/85% RH for minimum 192 hours)
<p>As per the Solar Photovoltaics, Systems, Devices and Components Goods (Requirements for Compulsory Registration) Order, 2017, PV Modules used in the grid connected solar power projects shall be registered with BIS and bear the Standard Mark as notified by the Bureau of Indian Standards.</p> <p>Further, PV Modules should have been included in the ALMM list as per MNRE Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirements for Compulsory Registration) Order, 2019</p>	

## Expression of Interest for Manufacturing and Supply of Solar PV Modules with DCR



### 1.2 Technical Requirements

Parameter	Specification
Cell/ Module Technology	Multi-crystalline /Mono-crystalline PERC/ Thin-Film CdTe
Origin	Modules and Cells shall be domestically manufactured
Module Efficiency	≥ 19.5% for Monocrystalline PERC ≥ 17.4% for Thin-Film CdTe ≥ 17% for Multicrystalline
Rated power at STC	No negative tolerance is allowed
Temperature co-efficient of power	Not less than -0.40%/°C
Application Class as per IEC 61730	Class A

### 1.3 Component Specifications

#### 1.3.1 Module Glass

##### 1.3.1.1 Crystalline Silicon Modules

(i) Glass/Backsheet Modules: The PV Modules glass panel shall have transmittance of above 90%. The minimum thickness of glass shall be 3.2 mm.

(ii) Glass/Glass Modules: Glass shall have minimum 2 mm thickness on each side. It shall be laminated using a laminator with a symmetrical structure, i.e heating plate on both sides. Glass shall have transmittance above 90%

##### 1.3.1.2 Thin Film Modules

(i) Glass/Glass Modules: Glass shall have minimum 2 mm thickness on each side. It shall be laminated using a laminator with a symmetrical structure, i.e heating plate on both sides. Glass shall have transmittance above 90%.

1.3.2 For Crystalline Silicone Glass/Polymer PV Modules, the back sheet used in the PV modules shall be of three-layered structure durable for humid – hot conditions with properties of moisture barrier, elongation retention and UV resistance. The back sheet shall have the following properties:

## Expression of Interest for Manufacturing and Supply of Solar PV Modules with DCR



Parameter	Value
Material Thickness	≥ 300 micron
Water Vapor Transmission Rate	< 2 g/m <sup>2</sup> /day
Partial Discharge Test Voltage	≥ 1000V/1500V
Elongation at Break	> 100%
Adhesion Strength with Encapsulant	> 70 N/cm <sup>2</sup>
Interlayer Strength	> 5N/cm

- 1.3.3 For Crystalline Silicon Modules, the encapsulant used for the PV modules should be polyolefin based, UV resistant and PID resistant in nature. No yellowing of the encapsulant with prolonged exposure shall occur. The encapsulant shall have the following properties.

Parameter	Value
Gel content	> 75%
Volume resistivity	> 1×10 <sup>14</sup> Ω.cm
Peeling strength with glass	> 40 N/cm

- 1.3.4 The sealant used for edge sealing of PV modules shall have excellent moisture ingress protection with good electrical insulation (Break down voltage >15 kV/mm) and with good adhesion strength. Edge tapes for sealing are not allowed.

- 1.3.5 The module frame shall be made of anodized Aluminium. It shall have provision for earthing to connect it to the earthing grid. The anodization thickness shall not be less than 15 micron.

- 1.3.6 The material used for junction box shall be UV resistant to avoid degradation during module life. The degree of protection of the junction box shall be at least IP67. Minimum three number of bypass diodes and two number of IEC 62852/EN 50521 certified MC4 compatible connectors with appropriate length of IEC 62930/EN 50618 certified 4 sq.mm copper cable shall be provided. The cable length shall be in accordance with the PV Module wiring strategy and adequate to ensure that the cable bending radius standard is

## Expression of Interest for Manufacturing and Supply of Solar PV Modules with DCR



not exceeded.

1.3.7 Each PV Module shall be provided a bar code which is embedded inside the module lamination and must be able to withstand harsh environmental conditions. The bar code data base shall contain the following information. Bar code scanner and database of all the modules containing the following information shall also be provided.

- (i) Name of the manufacturer of PV Module
- (ii) Name of the Manufacturer of Solar cells
- (iii) Type of cell: Mono / Multi
- (iv) Month and year of the manufacture (separately for solar cells and module)
- (v) Country of origin (separately for solar cells and module)
- (vi) I-V curve for the module
- (vii) Peak Wattage,  $I_m$ ,  $V_m$  and FF for the module
- (viii) Unique Serial No. and Model No. of the module.
- (ix) Date and year of obtaining IEC PV module qualification certificate
- (x) Name of the test lab issuing IEC certificate
- (xi) Other relevant information on traceability of solar cells and modules as per ISO 9000 series.

### 1.4 Warranty

1.4.1 PV modules must be warranted with linear degradation rate of power output except for first year (maximum 3% including LID) and shall guarantee 80% of the initial rated power output at the end of 25 years.

1.4.2 The modules shall be warranted for minimum of 10 years against all material/manufacturing defects and workmanship.

1.4.3 The above warranties shall be backed by third party insurance.

### 1.5 Approval

1.5.1 The Supplier shall provide Guaranteed Technical Particular (GTP) datasheet and Bill of Materials (BOM) of the module that is submitted for approval along with the datasheets of each component. The component datasheet shall contain all the information to

## Expression of Interest for Manufacturing and Supply of Solar PV Modules with DCR



substantiate the compliance for component specifications mentioned above.

- 1.5.2 The Supplier shall also provide test certificates corresponding to the standards mentioned above along with complete test reports for the proposed module. The tests should have been conducted at a test laboratory compliant with ISO 17025 for testing and calibration and accredited by an ILAC/IECEE member signatory. Laboratory accreditation certificate or weblink along with scope of accreditation shall also be submitted.
- 1.5.3 The BOM proposed shall be the subset of Constructional Data Form (CDF)'s of all the test reports.
- 1.5.4 The Supplier shall submit a detailed Manufacturing Quality Plan (MQP) for the PV Module with list of checks/tests performed during incoming material inspection, production, pre-dispatch and package.
- 1.5.5 The Supplier shall obtain the approval of the proposed module make & model prior to manufacturing/ inspection call.

### 1.6 Manufacturing and Inspection

- 1.6.1 The Supplier shall inform the module manufacturing schedule to the Employer at least 7 (seven) working days before the start of proposed schedule.
- 1.6.2 The Employer shall perform material inspection at the Manufacturer's factory before the start of proposed manufacturing schedule. Proof of procurement of components as per the approved BOM mentioning manufacturer name, manufacturing date and relevant test certificate shall be submitted during material inspection for verification.
- 1.6.3 The Manufacturing shall start only after the clearance by the Employer after the material inspection.
- 1.6.4 The cells used for module making shall be free from all defects like edge chipping, breakages, printing defects, discoloration of top surface etc. Only Class A solar cell shall be used.
- 1.6.5 The modules shall be uniformly laminated without any lamination defects.
- 1.6.6 Current binning of modules shall be employed to limit current mismatch of modules. Different colour codes shall be provided on the modules as well as pallet for identification

	<b>Expression of Interest for Manufacturing and Supply of Solar PV Modules with DCR</b>	
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of different bins. Maximum three nos. of bins will be allowed for each module rating.

1.6.7 Pre-dispatch inspection of modules shall be performed as per the inspection protocol attached in Annexure – I(A).

1.7 Transportation, Handling, Storage and Installation

1.7.1 Transportation, handling, storage and installation of modules shall be in accordance with the manufacturer manual so as not to breach warranty conditions. The Standard Operating Procedure (SOP) for the same shall be shared by the Supplier prior to dispatch.



**Annexure - IV**

**PHOTOVOLTAIC MODULE GTP**

**(To be filled and submit during bid submission)**

**Expression of Interest for Manufacturing and Supply of  
Solar PV Modules with DCR**



**Form: Photovoltaic Module – GTP**  
(To be filled and submitted during Bid Submission)

<b>Manufacturer Name</b>	
<b>Model No.</b>	
<b>Date of Submission</b>	

Cl. No.	Specification	Compliance	Reference	Remarks
<b>1.1</b>	<b>Standards and Codes</b>			
	IS 14286 : Part 1 : 2019 (Crystalline)		Chapter-3: Test Certificates & Reports	
	IS 14286 : Part 1 : Sec 1 : 2019 (Crystalline) IS 14286 : Part 1 : Sec 2 : 2019 (Thin-film)			
	IS/IEC 61730-1:2016 Ed.2			
	IS/IEC 61730-2:2016 Ed.2			
	IS/IEC 61701:2011 Ed.2			
	IS 16664 : 2018			
	IS 17210 : Part 1 : 2019			
	ALMM Listed (Yes/No)			
<b>1.2</b>	<b>Technical Requirements</b>			
	Cell Type	Multi-crystalline /Mono-crystalline PERC/ Thin-Film CdTe	Chapter-1: GTP Datasheet	
	Module Efficiency	≥ 19.5% for Monocrystalline PERC ≥ 17.4% for Thin-Film CdTe ≥ 17% for Multicrystalline		
	Temperature co-efficient of power	Not less than -0.40%/°C for Crystalline Si		
	Ambient temperature	-10°C to +50°C		
	Wind speed	Suitable for site condition		
	Application Class as per IEC 61730	Class A		
<b>1.3</b>	<b>Component Specifications</b>			
1.3.1	Glass			
	Material	Toughened low iron	Annexure-2: Bill of Materials	
	Thickness	> 3.2 mm, for Crystalline Silicon Modules >2 mm, for Thin-film Modules		
	Transmittance	> 90%		
1.3.2	Back sheet (For Crystalline Silicon Modules)			

**Expression of Interest for Manufacturing and Supply of  
Solar PV Modules with DCR**



**Form: Photovoltaic Module – GTP**  
(To be filled and submitted during Bid Submission)

<b>Manufacturer Name</b>	
<b>Model No.</b>	
<b>Date of Submission</b>	

Cl. No.	Specification	Compliance	Reference	Remarks
	Structure	Three layered	Annexure-2: Bill of Materials	
	Material thickness	≥ 300 micron		
	Water vapour transmission rate	< 2 g/m <sup>2</sup> /day		
	Partial discharge test voltage	≥ 1000 V/ 1500 V		
	Elongation at break	> 100%		
	Adhesion strength with encapsulant	> 70 N/cm		
	Interlayer adhesion strength	> 5 N/cm		
1.3.3	Encapsulant (For Crystalline Silicon Modules)		Annexure-2: Bill of Materials	
	Gel content	> 75%		
	Volume resistivity	> 1×10 <sup>15</sup> Ω.cm		
	Peeling strength with glass	> 60 N/cm		
1.3.4	Sealant			
	Breakdown voltage	>15 kV/mm	Annexure-2: Bill of Materials	
1.3.5	Frame			
	Material	anodized aluminium	Annexure-2: Bill of Materials	
	Anodization thickness	≥ 15 micron		
1.3.6	Junction box			
	Degree of protection	IP 67	Annexure-2: Bill of Materials	
	No. of bypass diodes	≥ 3		

**Expression of Interest for Manufacturing and Supply of  
Solar PV Modules with DCR**



**Form: Photovoltaic Module – GTP**  
(To be filled and submitted during Bid Submission)

<b>Manufacturer Name</b>	
<b>Model No.</b>	
<b>Date of Submission</b>	

Cl. No.	Specification	Compliance	Reference	Remarks
	Connector	2 nos. of MC4		
	Cable cross section	4 sq.mm		
	Cable material	Copper		
1.3.7	Bar code			
	(i) Name of the manufacturer of PV Module			
	(ii) Name of the Manufacturer of Solar cells			
	(iii) Type of cell: Mono / Multi			
	(iv) Month and year of the manufacture (separately for solar cells and module)			
	(v) Country of origin (separately for solar cells and module)			
	(vi) I-V curve for the module			
	(vii) Peak Wattage, Im, Vm and FF for the module			
	(viii) Unique Serial No. and Model No. of the module.			
	(ix) Date and year of obtaining IEC PV module qualification certificate			
	(x) Name of the test lab issuing IEC certificate			
	(xi) Other relevant information on traceability of solar cells and modules as per ISO 9000 series.			
2.4	Warranty			
2.4.1	Linear degradation of power output except for first year 80% of the initial rated power output at the end of 25 years		Annexure-4: Model Warranty Statement	
2.4.2	10 years warranty against all material/ manufacturing defects and workmanship			

## Expression of Interest for Manufacturing and Supply of Solar PV Modules with DCR



### Chapters

S. No.	Chapters	Attached
1	Guaranteed Technical Particular (GTP) Datasheet	
2	Bill of Materials (BOM)	
3	Test Certificates/Reports	
4	Model Warranty Statement	
5	Manufacturing Quality Plan (MQP)	
6	Installation Manual	

### Chapter – 1: Guaranteed Technical Particular (GTP) Datasheet

S. No.	Parameter	Unit	Value
1	Manufacturer		
2	Model number		
3	Cell type (N-type/P-type & Mono/Multi/Thin-film)		
4	Number of cells	Nos.	
5	Rated power at STC	Wp	
6	Power tolerance	%	
7	Open circuit voltage	V	
8	Short circuit current	A	
9	Maximum power point voltage	V	
10	Maximum power point current	A	
11	Module efficiency	%	
12	Temperature co-efficient		
	(a) Rated power	%/°C	
	(b) Open circuit voltage	%/°C	
	(c) Short circuit current	%/°C	
13	Maximum system voltage	V	
14	Maximum series fuse rating	A	
15	Operating temperature range	°C	
16	Nominal operating cell temperature	°C	
17	Relative humidity	%	
18	Wind speed	kmph	

**Expression of Interest for Manufacturing and Supply of  
Solar PV Modules with DCR**



19	Dimensions	Mm	
20	Weight	Kg	

**PV Module Drawings (Rear view, Side view & Cross-sectional view)**

**I-V and P-V curves**

**Chapter – 2: Bill of Materials (BOM)**

Note: Datasheets of all the components shall be attached. The datasheets shall contain all the technical parameters to substantiate the compliance of the component against technical specifications.

### Chapter – 3: Test Certificates/Reports

#### Summary

S. No	Standard	Testing laboratory with complete address	Test certificate issuance date (dd.mm.yyy)	Laboratory accreditation certificate			
				Reference No. (Test Report No.)	Date of issue (dd.mm.yyy)	Date of expiry (dd.mm.yyy)	Weblink of laboratory accreditation certificate (in case certificate is not submitted)
1	IS 14286 : Part 1 : 2019						
2	IS 14286 : Part 1 : Sec 1 : 2019 (Crystalline ) IS 14286 : Part 1 : Sec 2 : 2019 (Thin-film)						
3	IEC 61730-1:2016 Ed.2						
4	IEC 61730-2:2016 Ed.2						
5	IEC 61701:2011 Ed.2						
6	IS 16664 : 2018						
7	IS 17210 : Part 1 : 2019						

#### Notes:

- (1) Test certificate shall be submitted along with complete test report including all annexures and appendices.
- (2) The date of issue of test certificate shall not be earlier than the date of issue of laboratory accreditation certificate and not later than the date of expiry of laboratory accreditation certificate.
- (3) Web link of laboratory accreditation certificate along with scope of accreditation shall be submitted. The weblink shall be that of the accrediting agency. In case, such web link is not available, accreditation certificate along with scope of accreditation shall be submitted.



**Annexure - V**

**PRE-DISPATCH INSPECTION  
PROTOCOL**

# Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



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# Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



## Pre-dispatch inspection procedure

### **A Objective:**

The objective of this document is to establish General inspection protocol with objectivity for verification of Quality Parameters of Solar Modules by the customer (or its authorised inspection agency) prior to dispatch. The decision rules and procedure specified herein seek to uphold quality standards based on industry best practices and technical specifications laid out in tender documents as well as to control risks associated with item procurement.

### **B Standard:**

Sampling for determining Acceptance Quality Level (AQL) shall follow ISO2859-1:1999.

### **C Definitions:**

1. Lot: All products/items manufactured in one batch.  
*Notwithstanding the aforementioned definition, the customer or authorized inspection agency can lay down alternate/additional criteria for determining a lot.*
2. Major Defect: A defect that reduces the usability or causes the product to fail to fulfil its nominal characteristic function.
3. Minor Defect: A defect that does not reduce the usability of the product, but does not meet the quality standard.

### **D Inspection Schedule:**

Customer representative shall propose the schedule for Pre despatch Inspection of Finished Goods to the Customer well in advance, and in no case less than 3 working days prior to commencement of Inspection at a location within India and 7 days in case of a foreign country.

### **E Scope of Inspection:**

Supplier representative will accompany the Inspector while doing the inspection which shall typically consist of 2 steps for clearance of each Lot:

## Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



### 1 BOM verification: To be conducted prior to the commencement of production.

The details of materials used will be verified from the ERP/Manufacturing data and corroborated with the Construction Data Form (CDF). This shall include verification of following:

Item	Method of Verification
Shelf life of the following BOM items: <ul style="list-style-type: none"><li>• EVA</li><li>• PV Module Backsheet</li><li>• Sealant and potting material (Silicone)</li></ul>	. Verify the expiry date/shelf life and storage conditions  <i>The PV Module manufacturer shall submit all required information to prove that materials being used are within their shelf life.</i>

*Note: Supplier shall provide the necessary documents for approval of BOM as per IEC standards and tender Technical Specifications.*

### 2 Witness Tests:

Manufacturer shall assist the Inspecting agency to witness following checks, the details of which are provided elsewhere in this document:

- I. Flash test- As per sampling Plan
- II. Visual Inspection- As per sampling Plan
- III. EL Inspection-As per Sampling Plan
- IV. Electrical Characteristics (Other than Flash Test)- As per Sampling Plan

**Note:** The Supplier shall furnish soft and hard copy of the Production Quality Plan prior to commencement of the Inspection.

### F Sampling Process:

- a. Supplier shall provide the list of modules in a lot ready for despatch, along with flash test data (Measured Electrical Data, Pmax) prior to commencement of Inspection tests.

## Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



**Note:** Smallest lot size for Inspection: 20% of the capacity as per the PO.

- b. Supplier will arrange to move the PV Modules from FG to Inspection area.
- c. Same samples shall be used for all Witness Tests stated at 5.2 above.
- d. Inspector shall commence Inspection process by randomly selecting samples from the list of serial nos. (pallet-wise) provided by Supplier as per ISO 2859: Single Sampling Plan for Normal Inspection, General Inspection plan level-II (Ref Annexure-1).  
However, the Inspector shall reserve the right to switch to tightened or reduced level of Inspection as per the lot quality.

### G Decision Rules for Acceptance/Rejection

Following is a summary of Decision Rules for Acceptance/Rejection of a given Sample in a lot offered for Inspection:

**Table 1: AQL Levels**

Defect Type	AQL (%)
Major (Ma)	2.5
Minor (Mi)	4

**Table 2: Inspection Levels**

Inspection steps	Inspection item	Inspection level
1.	Flash Test	General inspection level I
2.	Visual	General inspection level I
3.	EL	General inspection level I
4.	EC (Other than Flash Test)	10 Nos. per lot

## Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



### H Inspection Process

#### a. Electrical Inspection – Flash Tests

For Electrical inspection following preparation will be done:

- Module Temp Stabilisation : Modules will be kept in controlled environmental condition till it reaches  $25 \pm 2^\circ\text{C}$
- Calibration of Sunsimulator: Sunsimulator will be calibrated as per Calibration Reference .Reference should calibrated against Calibration Reference tested from reputed testing lab TUV / Fraunhofer etc. Testing of modules will be done at STC condition, AM=1.5

**Note:**

- i All modules selected for sampling inspection will be re-tested in the sunsimulator. A  $P_{\max}$  retest (repeatability test) variation of  $\pm 2\%$  on actual flash  $P_{\max}$  value will be acceptable.
- ii The Supplier shall provide a valid calibration certificate of the apparatus used.

#### b. Visual Inspection:

- Customer representative will verify the module visual characteristics as per the Visual Acceptance norms specified at Annexure 3.
- The Visual Inspection shall be carried out in a well-lit room. It shall be the responsibility of the Supplier to ensure adequate brightness in the room.

#### c. Electroluminescence (EL) Inspection:

- The EL image shall have sufficient resolution for analysis of defects.
- Hi-pot test shall be done as per IEC procedure. The Supplier shall provide a valid calibration certificate of the apparatus used.
- Refer Annexure 3.

	<b>Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules</b>	
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## **I Re-inspection and review**

In case of minor non-conformities like cleaning issues, label mismatch, etc. which can be easily reworked, Supplier shall rework/replace the modules and offer them for re-inspection to Inspector.

## **J Inspection Summary:**

Once the inspection is completed Customer Representative will compile his Inspection Summary Report and share with Supplier and give necessary recommendation on despatch depending upon the audit findings based on the observations made. This report shall be provided within same day of inspection (Format Attached at Annexure 3).

## **K Disclaimer:**

*Inspection by SECI does not absolve the responsibility of the Supplier/Supplier to ensure quality during production of the material and its transport to site. Any damages during transport/ handling shall be replaced without any extra cost to the purchaser.*

## Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



### Annexure-1

#### (Sampling Plan as Per ISO 2859) -1

**Table 1 - Sample size code letters (see 10.1 and 10.2)**

Lot size	Special inspection levels				General inspection levels		
	S-1	S-2	S-3	S-4	I	II	III
2 to 8	A	A	A	A	A	A	B
9 to 15	A	A	A	A	A	B	C
16 to 25	A	A	B	B	B	C	D
26 to 50	A	B	B	C	C	D	E
51 to 90	B	B	C	C	C	E	F
91 to 150	B	B	C	D	D	F	G
151 to 280	B	C	D	E	E	G	H
281 to 500	B	C	D	E	F	H	J
501 to 1 200	C	C	E	F	G	J	K
1 201 to 3 200	C	D	E	G	H	K	L
3 201 to 10 000	C	D	F	G	J	L	M
10 001 to 35 000	C	D	F	H	K	M	N
35 001 to 150 000	D	E	G	J	L	N	P
150 001 to 500 000	D	E	G	J	M	P	Q
500 001 and over	D	E	H	K	N	Q	R

# Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



(Sampling Plan as Per ISO 2859) – 2 – Normal, Tightened and Reduced)

Table 2-A — Single sampling plans for normal inspection (Master table)

Sample size code letter	Acceptance quality limit, AQL, in percent nonconforming items and nonconformities per 100 items (normal inspection)																										
	0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1 000	
A	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
B	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
C	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
D	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
E	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
F	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
G	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
H	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
J	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
K	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
L	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
M	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
N	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
P	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
Q	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
R	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re

⇓ = Use the first sampling plan below the arrow. If sample size equals, or exceeds, lot size, carry out 100 % inspection.

⇑ = Use the first sampling plan above the arrow.

Ac = Acceptance number

Re = Rejection number

# Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



**Table 2-B — Single sampling plans for tightened inspection (Master table)**

Sample size code letter	Acceptance quality limit, AQL, in percent nonconforming items and nonconformities per 100 items (tightened inspection)																										
	0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1 000	
A	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
B	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
C	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
D	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
E	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
F	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
G	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
H	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
J	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
K	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
L	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
M	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
N	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
P	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
Q	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
R	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
S	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re

↘ = Use the first sampling plan below the arrow. If sample size equals, or exceeds, lot size, carry out 100 % inspection.

↙ = Use the first sampling plan above the arrow.

Ac = Acceptance number

Re = Rejection number

# Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



**Table 2-C — Single sampling plans for reduced inspection (Master table)**

Sample size code letter	Acceptance quality limit, AQL, in percent nonconforming items and nonconformities per 100 items (reduced inspection)																					
	0.010	0.015	0.025	0.040	0.065	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1 000	
	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
A	↓	↓	↓	↓	↓	↓	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
B	↓	↓	↓	↓	↓	↓	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
C	↓	↓	↓	↓	↓	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
D	↓	↓	↓	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
E	↓	↓	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
F	↓	↓	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
G	↓	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
H	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
J	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
K	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
L	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
M	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
N	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
P	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Q	↓	↓	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
R	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔

↔ = Use the first sampling plan below the arrow. If sample size equals, or exceeds, lot size, carry out 100 % inspection.

↔ = Use the first sampling plan above the arrow.

Ac = Acceptance number

Re = Rejection number

# Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



## Annexure 2

### L Performance Testing

#### 1 Visual Inspection

##### 1.1 Back Sheet

S.No.	Defect	Defect Type	Criteria	Picture
1.	Delamination of layer	Ma	Not accepted.	
2.	Discoloration	Mi	Not accepted.	
3.	Swollen appearance	Ma	Swollen appearance (hollow) is not accepted.	
4.	Dent	Mi	Dent $A \leq 400\text{mm}^2$ , $D \leq 2\text{mm}$ , $Q \leq 25$ per square meter	
5.	Corrugation	Mi	$1\text{mm} < H \leq 2\text{mm}$ , $L > 10\text{cm}$ , $Q \leq 3$ per square meter; $H > 2\text{mm}$ is not allowed; Corrugation caused by ribbon or cell is acceptable.	
6.	Scratch	Mi	Scratch should not expose EVA to the air.	

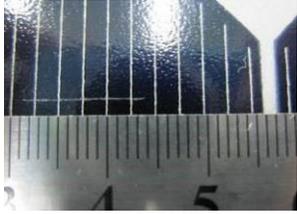
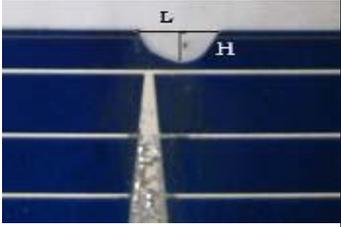
## Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



### 1.2 Bus bar and String Connector

1.	Bus bar position	Mi	Should within $5\pm 3\text{mm}$ to the cell nearby and should be $> 3\text{mm}$ to the frame nearby.
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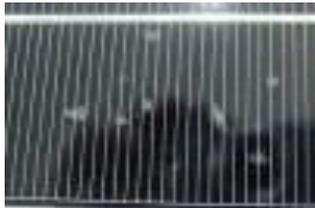
### 1.3 Cell

S.No.	Defect	Defect Type	Criteria	Picture
1.	Stain	Mi	Each stain $A \leq 20\text{mm}^2$ , $Q \leq 5$ per cell	
2.	Cell alignment problem	Mi	X or Y dislocation $\leq 4\text{mm}$	
3.	Scratch	Mi	Scratch not affecting the cell integrity or the printing And $L < 5\text{cm}$ , $W < 0.2\text{mm}$ are ignored	
4.	Chip	Mi	Chip $L \leq 20\text{mm}$ is allowed chip cannot touch the patterns or fingers on the cell.	

### 1.4 EVA

**Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules**



S.No.	Defect	Defect Type	Criteria	Picture
1.	Discoloration (Yellowing)	Mi	Discoloration is not accepted.	
2.	Bubble	Mi	1) On cell, $A \leq 4\text{mm}^2$ , $Q \leq 3$ per cell. 2) Out of cell, bubble can't expose cell to the atmosphere.	
3.	Delaminating of EVA	Ma	Not accepted.	

1.5 Glass

S.No.	Defect	Defect Type	Criteria	Picture
1.	Crack	Ma	Breakage is not accepted.	

## Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



2.	Scratch	Mi	$W \leq 1\text{mm}$ , $L \leq 150\text{mm}$ , $Q \leq 4$ per square meter; $1 \leq W \leq 2\text{mm}$ , $L \leq 150\text{mm}$ , $Q \leq 1$ per square meter; $W \geq 2\text{mm}$ is not allowed.	
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### 1.6 Sealant

S.No.	Defect	Defect Type	Criteria	Picture
1.	Sealant leakage at back side	Ma	The sealant should be continuous and all around the frame and lamination. Re-seal is necessary if sealant absent depth more than 6mm at any point.	
2.	Sealant leakage at front side	Mi	$W \leq 2\text{mm}$	

## 2 Other Checks

### 2.1 Pallet and Packing (Mi)

1. It shall be ensured that Pallet or carton box is not broken and packing is 'proper'.
2. Package must be properly strapped.

**Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules**



**3 Electroluminescence Test (EL Test)**

S.No.	Defect	Defect Type (Ma/Mi)	Criteria	Picture
1.	Micro crack	Ma	(i) Micro-crack > 1/2 cell side length, no more than 1 per cell; (ii) Micro-crack < 1/2 cell side length, no more than 2 per cell; (iii) No more than 1/12 of total number of cells with micro-crack defect per module.  Note: The above conditions {i.e. (i), (ii) & (iii)} shall be evaluated independent of each other.	
2.	Dark Spots	Ma	Dark area defect $A \leq 5\%$ of the corresponding cell area	
3.	Finger interruption or false printing	Mi	Dark area $\leq 5\%$ of cell area	
4.	Black heart	Ma	Black heart defect not allowed (applicable for mono-crystalline module).	
5.	Dead Cell	Mi	Not accepted	
6.	Wafer Grain Defects	Ma	Not accepted	
7.	Fish Bone/ Tree Crack/ Cross Crack	Ma	Not Accepted	

## Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



### Electrical Characteristics

S.No.	Metric	Details	Defect Type (Ma/Mi)	Criteria
1.	Power (Flash Test )	To measure Maximum power output	Ma	Output measurement result should within 2% measurement variation should be considered.
2.	Dielectric Withstand (Hipot) test	Stress test for solar panels insulation (beyond what it will encounter during normal operation)	Ma	1000 V plus twice the maximum system voltage for 1 min. (IEC 61215-2)  No dielectric breakdown
3.	Insulation Resistance	Stress test for solar panels insulation (to measure the insulation resistance)	Ma	Maximum system voltage for 2 min (based on IEC 61215)  $R \cdot \text{Area} \geq 40 \text{ M}\Omega \cdot \text{m}^2$
4.	Ground Continuity Test	To ensure that ground connections are proper	Ma	The measured impedance value should be $\leq 0.1 \Omega$  Duration: 120 seconds
5.	Wet Leakage Test	To test the safety of the Panel when it is wet	Ma	Maximum System Voltage for 60 seconds (based on IEC 61215)  $R \cdot \text{Area} \geq 40 \text{ M}\Omega \cdot \text{m}^2$

**Note:** The Supplier shall ensure that adequate safety measures are in place before commencement of test procedures to evaluate Performance characteristics.

**Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules**



**Annexure 3**

**CUSTOMER INSPECTION REPORT**

**Ref. No. & Date:**

**Client:**

**PMC:** SECI

**EPC Contractor:**

PO Ref. No.:

**Place of Inspection:**

**Date of inspection:**

**Lot Size**

**Sample Quantity**

**Problem Quantity:**

**Detail:**

**Inspection Result (OK/Not OK):**

**Visual Inspection**

**Problem Quantity:**

**Detail:**

**Flash Test**

**Problem Quantity:**

**Detail:**

**EL Inspection:**

**Problem Quantity:**

**Detail:**

**EC Inspection (Hipot,DC Continuity,IR):**

**Problem Quantity:**

**Detail:**

**Any Other Criteria/Remarks:**

**Is the shipment qualified to be released?**

**Yes**

**No**

## Expression of Interest for Manufacturing and Supply of 1200 MW DCR Solar PV Modules



From Client	From EPC Contractor	Solar Energy Corporation of India Limited
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Enclosed: Test Details, Flash Test Report, EL test (images- soft copy), EC Test Report

**Disclaimer:** *This Inspection by SECI/ [Name of Client] does not absolve the responsibility of the Supplier to ensure quality during production of the material and its transport to site. Any damages during transport/ handling shall be replaced before erection at site as directed by Engineer-in-charge without any extra cost to the purchaser.*

### Details:

Lot :				Date
S. No	Defect	Module Id	Type (Ma/Mi)	Details
1				
2				
....				