	SOLAR BUSINESS DIVISION	NOTICE INVITING TENDER (NIT)	MATERIAL: Solar Cell (Multi) 5BB 4.67Wp
TENDER REFERENCE: MSC12302481			

Dear Sir,

Subject: Tender for "Solar Cell (Multi) 5BB 4.67Wp ".

BHEL invites offers from reputed Vendors {Refer Pre-qualifying (PQR) requirements and other requirements given in tender enquiry letter uploaded on our websites) for supply including packing & transportation to as per incoterms, satisfactory completion of supply of " **Solar Cell (Multi) 5BB 4.67Wp** as per Tender Ref:MSC12302481".

Your offer shall be submitted in two parts strictly as per "Instructions to Bidders" of GCC, Rev R0. Your best quotation / offer for the above requirement, in line with our terms and conditions, should be quoted online through BHEL NIC Portal.

It shall be the responsibility of the bidder to ensure that the tender is quoted on or before the due date and time.

ENQUIRY TERMS AND CONDITIONS

The prices offered shall be firm till the completion of project.

Part-I: **TECHNO-COMMERCIAL BID** Part-II: **PRICE BID.**

For detailed instructions. Please see "Instructions to Bidders of GCC Rev. R0".

1. Bidders shall submit their offers meeting the requirements of the following tender documents (enclosed).

General Conditions of Contract (GCC) Rev R0 comprising of: Instructions to Bidders and General Commercial Terms & Conditions. Technical Specification, Price format & Special Conditions of Contract (SCC).

2. Tenders shall be submitted strictly in accordance with the requirements of the above tender documents. In case of deviations (Technical/ Commercial), the same shall be highlighted separately giving clause references along with the **Cost of withdrawal of Deviations as per Annexure-II to GCC Rev. R0 of "DEVIATION SHEET (COST OF WITHDRAWAL)"** along with reasons for taking such deviations.

Cost of withdrawal for the deviations, for which, the "Cost of withdrawal" is not specified, shall be taken as NIL. **Bidder to note all the points mentioned in "Notes" of Annexure-II to GCC Rev.R0.**


3. All the above Tender Documents shall automatically become a part of the Order / Contract after its finalisation.

4. Bidder has to submit "NO DEVIATION CERTIFICATE FOR COMMERCIAL TERMS AND CONDITIONS as per General Conditions of Contracts (GCC, Rev.R0), Special Conditions of Contracts and Notice Inviting Tender (NIT)" **in case of no deviations.**

5. Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any/all tender(s) in part or full without assigning any reason whatsoever.

6. Late tenders are liable to be rejected.

7. All correspondence thereof, shall be addressed to the undersigned by name & designation and sent at the following address:


	SOLAR BUSINESS DIVISION	NOTICE INVITING TENDER (NIT)	MATERIAL: Solar Cell (Multi) 5BB 4.67Wp
TENDER REFERENCE: MSC12302481			

<u>Commercial</u> S Pankaj Kumar- Dy Manager-MM Manjunath Rao- Engineer-MM. BHEL-SBD, Prof CNR Rao Circle, IISc Post, Malleswaram, Bangalore- 560 012 E-MAIL: spankaj@bhel.in; manjunath.rao@bhel.in ; Ph. No. +91-080-22182269/2286, 8126333426/9449115728	<u>Technical</u> Subir Roy-Sr. Engineer BHEL-SBD, Prof CNR Rao Circle, IISc Post, Malleswaram, Bangalore- 560 012 E-MAIL: subirroy@bhel.in; Ph. No. +91-080-22182495, +91 9486847302
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8. Bidders, who are not registered with BHEL-SBD, are requested to get registered through online supplier registration portal available on <https://supplier.bhel.in/>
 9. BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on (www.bhel.com)) for this tender. RA shall be conducted among the techno commercially qualified bidders. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.”
Bidders are required to submit their acceptance to the terms/ conditions/ modalities before participating in the Reverse Auction in the process compliance form as enclosed. Without this, the bidder will not be eligible to participate in the event.
 10. The evaluation of the offer shall be done on the basis of delivered cost (i.e. Total F.O.R. BHEL EPD stores, Bangalore price for supply with necessary loadings as applicable) as per GCC Rev. R0.
 11. Please note that detailed offers are to be submitted including the following documents duly stamped & signed on each page:
 12. Acceptance of GCC, Rev.R0.
 13. Acceptance of Special Conditions of Contract (SCC).
 14. Pre-qualifying Requirements (PQRs) documents including Technical Bid Format with supporting documents.
 15. Technical Deviations and commercial deviations, if any as per format enclosed at Annexure-II of GCC, Rev.R0.
 16. Annexure – I, III, VII, XIII, XIV, XVIII & XIX of GCC Rev R0.
 17. Along with your offer, please submit a copy of this letter duly signed & stamped on each page as token of acceptance of all terms & instructions conveyed.
 18. Un-Priced price schedules (format) duly filled in ‘Quoted’ or ‘Q’ in each column/row.
 19. Separate sealed price-bid envelope mentioning Tender/Enquiry No., RFQ due date & Name of the item in BOLD LETTERS on the top of envelope.
- Note: Bidder must submit UN-PRICED Price format duly filled mentioning the word “QUOTED” in place of actual price. The actual price is to be filled in separately and submitted in sealed price bid.**
20. Bidders to keep visiting BHEL website i.e www.bhel.com for any Amendments/Clarifications/Corrigenda/Errata etc issued in respect of the tender documents by BHEL. Same shall be uploaded on above BHEL website.
 21. Order of Precedence.

In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:

1. Amendments/Clarifications/Corrigenda/Errata etc. issued in respect of the tender documents by BHEL.
2. Notice Inviting Tender (NIT)
3. Price Schedule

 1	SOLAR BUSINESS DIVISION	NOTICE INVITING TENDER (NIT)	MATERIAL: Solar Cell (Multi) 5BB 4.67Wp
TENDER REFERENCE: MSC12302481			

4. Special Conditions of Contract (SCC)
5. Technical specification & scope of work
6. General Conditions of Contract (GCC)

Thanking You.
Yours faithfully,

For and on behalf of BHEL

(Manjunath Rao)
Engineer-MM

Enclosures:

1. Enquiry Letter with Terms & Conditions (This letter)
2. RFQ, PQR, QAP's & Technical Specifications
3. Special Conditions of Contracts (SCC)
4. Price formats/schedules (Prices should be quoted strictly in this format only)
5. General Conditions of Contracts (GCC Rev R0)
6. Conciliation Scheme Annexure-A

	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE -560012 QUALITY (SPV)	QP NO.: EPD/QP/SPV/2020-21/0015 REV. NO.: 00 DATE: 12.03.2021
BHEL-SBD		STANDARD QUALITY ASSURANCE PLAN

For the items listed below, the Supplier shall raise the inspection call along with Internal Test Report, Manufacture Test Certificates/Type Test Reports (wherever applicable) for BHEL/BHEL TPIA /Customer Inspection.

Sl no	Item/BHEL SPEC.
01	ITEM : SILICON SOLAR CELL – MULTI CRYSTALLINE 5 BUS BAR BHEL SPECIFICATION: PS-901-05-0018 REV.04

Note:

1. The SQAP shall be read in conjunction with BHEL Specification mentioned in Purchase Order and shall deem to include any additional tests as per the specification/Standard.
2. Material supplied shall be in line with BHEL Purchase Order, Technical Specification, Data Sheet, BOM, Approved Drawings, applicable Standard References, or any other document/references.
3. In case of any contradiction between this SQAP, BHEL Specifications the following precedence shall be followed:
1st: BHEL Purchase Order Specification;
2nd: This STANDARD QUALITY ASSURANCE PLAN & Applicable standard;
3rd: Manufacturers plant standards
4. Packing shall be as per BHEL purchase order packing specification/ or as per Manufacturer standard or approved Drgs from BHEL Engineering.
5. All packing cases should be marked with BHEL Purchase Order no, Item description and **CQIR NO** (by which material has been cleared for dispatch).
6. BHEL reserves the right for pre-dispatch inspection at vendor works by BHEL or BHEL nominated agency.
7. BHEL at its discretion may waive the pre-dispatch inspection at vendors work based on review of submitted vendor inspection reports. However, the vendor responsibility is not absolved till the material is finally inspected and accepted at BHEL. In case of any rejection at BHEL, vendor is liable to replace with good quality materials at vendor cost confirming with this purchase specification.
8. Vendor to submit Manufacturing Quality Plan – MQP in BHEL prescribed format in BHEL prescribed format for review & approval on receipt of purchase order.

Documentation Part:

1. Supplier shall raise the inspection call in the CQIR with inspection agency as BHEL SBD. URL: www.cqir.bhel.in. and shall upload documents mention under Note 2 in CQIR Portal.
2. Supplier to furnish Test Certificates, Internal Tests Report and Type Test Reports (wherever applicable) as per this SQAP along with inspection call.
3. The items will be inspected at BHEL approved manufacturer work.

PREPARED BY:		APPROVED BY:	
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 BHBL-SBD	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION PROF.C.N.R RAO CIRCLE, IISc POST MALLESHWARAM, BENGALURU-560012	STANDARD QUALITY ASSURANCE PLAN					QP NO.: EPD/QP/SPV/2020-21/0015 REV. NO.: 00 DATE: 12.03.2021 PAGE 1 OF 5
		ITEM : SILICON SOLAR CELL – MULTI CRYSTALLINE 5 BUS BAR BHBL SPECIFICATION: PS-901-05-0018 REV.04					

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY		REMARKS
					M	B					M	B	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	**	10.	11.

1.0 IN-PROCESS INSPECTION													
A	DIMENSIONS	Length	Critical	Dimensional	Hourly	-	BHEL Spec.	157± 0.5 mm	Inspection Report	√	P	V	
B		Width	Critical	Dimensional	Hourly	-	BHEL Spec.	157± 0.5 mm	Inspection Report	√	P	V	
C		Thickness (Microns)	Critical	Dimensional	Hourly	-	BHEL Spec.	200 ± 20	Inspection Report	√	P	V	
D		Diagonal Difference	Critical	Dimensional	Hourly	-	BHEL Spec.	≤ 0.5 mm	Inspection Report	√	P	V	
E		Cell bow (mm)	Major	Dimensional	Hourly	-	BHEL Spec.	< 1.0	Inspection Report	√	P	V	
F	VISUAL CHECK	No. of Busbars	Major	Visual	100% Online	-	BHEL Spec.	Five	Inspection Report	√	P	V	
G		Shape	Major	Visual	100% Online	-	BHEL Spec.	Square	Inspection Report	√	P	V	
H		Anti-Reflection coating	Major	Visual	100% Online	-	BHEL Spec.	PECVD - Silicon Nitride (Blue Color)	Inspection Report	√	P	V	
I		Visual defects	Major	Visual	100% Online	-	BHEL Spec.	As per BHEL Spec.	Inspection Report	√	P	V	
J		Metallization	Major	Visual	100% Online	-	BHEL Spec.	Front-Silver Back-Silver Bus bar with Aluminum BSF	Inspection Report	√	P	V	
2.0 FINISHED PRODUCT INSPECTION													
A	ROUTINE TESTS	Cell Power Wattage (Wp)	Critical	Electrical	100%	AQL*	BHEL Spec.	As per Section 2.0 of BHEL Spec.	Inspection Report	√	P	W	

LEGEND: *D: RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY VENDOR IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-VENDOR, B: BHEL/BHEL NOMINATED INSPECTION AGENCY P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE CHP: CUSTOMER HOLD POINT BY BHEL/BHEL NOMINATED INSPECTION AGENCY SHALL IDENTIFIED IN COLUMN "B" AS 'W' AQL*: SINGLE SAMPLING PLAN AS PER ISO: 2859-1 / IS: 10673-1983, GENERAL INSPECTION LEVEL - 2, AQL 0.65	FOR BHEL USE DOC. NO.: <i>re accepted</i> REV..... <i>04</i> CAT.....		
	REVIEWED BY: MM	APPROVED BY: MK	QUALITY ASSURANCE

SL NO		COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY		REMARKS
						M	B				D*	M	B	
1.	2.	3.	4.	5.	6.		7.	8.	9.		**	10.	11.	
B		Typical I-V Characteristics	Critical	Electrical	100%	AQL*	BHEL Spec.	As per Section 2.0 of BHEL Spec.	Inspection Report	√	P	W		
C		Soldering Peel strength	Critical	Mechanical	Hourly	Single Sampling Plan as per ISO: 2859-1 / IS: 10673-1983, Special Inspection Level - I, AQL 1.5	BHEL Spec.	≥1.0 N/mm Front (Across each bus bar) ≥1.5 N/mm Back (Across each bus bar)	Inspection Report	√	P	W		
D	DIMENSIONS	Length	Critical	Dimensional	Hourly	AQL*	BHEL Spec.	157± 0.5 mm	Inspection Report	√	P	W		
E		Width	Critical	Dimensional	Hourly	AQL*	BHEL Spec.	157± 0.5 mm	Inspection Report	√	P	W		
F		Thickness (Microns)	Critical	Dimensional	Hourly	AQL*	BHEL Spec.	200 ± 20	Inspection Report	√	P	W		
G		Diagonal Difference	Critical	Dimensional	Hourly	AQL*	BHEL Spec.	≤ 0.5 mm	Inspection Report	√	P	W		
H		Cell bow (mm)	Major	Dimensional	Hourly	AQL*	BHEL Spec.	1.0	Inspection Report	√	P	W		
I	VISUAL CHECK	No. of Busbars	Major	Visual	100% Online	AQL*	BHEL Spec.	Five	Inspection Report	√	P	W	Certificate Of Compliance (COC) for each point to be given	
J		Cell Material & Cell Type	Major	Functional	100% Online	AQL*	BHEL Spec.	Multi (Poly) Crystalline Silicon	Inspection Report	√	P	V		
K		Shape	Major	Visual	100% Online	AQL*	BHEL Spec.	Square	Inspection Report	√	P	W		

LEGEND: *D: RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY VENDOR IN QA DOCUMENTATION.

** M: MANUFACTURER/SUB-VENDOR, B: BHEL/BHEL NOMINATED INSPECTION AGENCY

P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE

CHP: CUSTOMER HOLD POINT BY BHEL/BHEL NOMINATED INSPECTION AGENCY SHALL IDENTIFIED IN COLUMN "B" AS 'W'

AQL*: SINGLE SAMPLING PLAN AS PER ISO: 2859-1 / IS: 10673-1983, GENERAL INSPECTION LEVEL - 2, AQL 0.65

FOR BHEL USE

DOC. NO.:

REV.....

CAT.....

Re. acceptance

Of

REVIEWED BY: MM

APPROVED BY: MK

QUALITY ASSURANCE

SL. NO		COMPONENT & OPERATIONS	CHARACTERISTIC S	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY		REMARKS
						M	B				D +	M	B	
1.		2.	3.	4.	5.	6.		7.	8.	9.	**	10.	11.	
L			Anti-Reflection coating	Critical	Functional	100% Online	AQL*	BHEL Spec.	PECVD - Silicon Nitride (Blue Color)	Inspection Report	v	P	V	
M			Visual defects	Critical	Visual	100% Online	AQL*	BHEL Spec.	The cells shall be of 'A' category without any visual defects. No edge chips or any visible crack or deep scratches. No printing defects, No misalignment (of bus-bars) on the either surface. Cells must have precise printing & superior silver contacts for ease of automatic soldering. No print shift, finger knots other printing defects of more than 0.5 mm on width and 3.0 mm on length. No bus bar or grid line interruptions, finger print interruptions, finger breaks, stains or paste smudges on either surface etc.	Inspection Report	v	P	W	

LEGEND: *D: RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY VENDOR IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-VENDOR, B: BHEL/BHEL NOMINATED INSPECTION AGENCY P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE CHP: CUSTOMER HOLD POINT BY BHEL/BHEL NOMINATED INSPECTION AGENCY SHALL IDENTIFIED IN COLUMN "B" AS 'W' AQL*: SINGLE SAMPLING PLAN AS PER ISO: 2859-1 / IS: 10673-1983, GENERAL INSPECTION LEVEL - 2, AQL 0.65	FOR BHEL USE		
	DOC. NO.:	REV.....	CAT.....
	REVIEWED BY: MM	APPROVED BY: MK	QUALITY ASSURANCE

SL. NO		COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY		REMARKS
						M	B				M	B	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	**	10.	11.
N		Metallization	Major	Visual	100% Online	-	BHEL Spec.	Front-Silver Back-Silver Bus bar with Aluminum BSF	Inspection Report	√	P	V	
O	SPECIAL TESTS	PID Resistance	Critical	Functional	AQL*	AQL*	BHEL Spec.	Cell shall be 100% PID Resistant.	Inspection Report	√	P	V	Certificate Of Compliance (COC)
P		Electroluminescence Test	Critical	Functional	AQL*	AQL*	BHEL Spec.	Cell shall not have Micro Crack, Dark Area, Dark Spot & Dead cell	Inspection Report	√	P	W	
3.0	PACKING												
A	PACKING	Packing	Major	Visual	100%	AQL*	BHEL Spec.	Cell shall be vacuum / air tight packed with heat shrinkable sleeve or polythene / polypropylene sachets of not more than 125 cells per sachet.	COC	√	P	W	Certificate Of Compliance (COC) for each point to be given
B		Packing	Major	Visual	100%	AQL*	BHEL Spec.	Sachets shall be packed in foam / thermocol boxes with soft pads on both ends or in polyethylene foam packing to absorb transit handling shocks.	COC	√	P	W	

LEGEND: *D: RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY VENDOR IN QA DOCUMENTATION.

** M: MANUFACTURER/SUB-VENDOR, B: BHEL/BHEL NOMINATED INSPECTION AGENCY

P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE

CHP: CUSTOMER HOLD POINT BY BHEL/BHEL NOMINATED INSPECTION AGENCY SHALL IDENTIFIED IN COLUMN "B" AS 'W'

AQL*: SINGLE SAMPLING PLAN AS PER ISO: 2859-1 / IS: 10673-1983, GENERAL INSPECTION LEVEL - 2, AQL 0.65

FOR BHEL USE

DOC. NO.:

REV.....

CAT.....

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REVIEWED BY: MM


APPROVED BY: MK


QUALITY ASSURANCE


SL. NO	COMPONENT & OPERATIONS	CHARACTERISTIC S	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY		REMARKS
					M	B				M	B	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10.	11.
C		Packing	Major	Visual	100%	AQL*	BHEL Spec.	Packing of sachets shall be in carton boxes with soft spacers & bubble wrap. Final packing shall be with suitable pallet for mechanised handling.	COC	v	P W	
D		Packing	Major	Visual	100%	AQL*	BHEL Spec.	The final packing shall be with suitable pallet for mechanized handling. Manufacturer name, Cell type, Lot number, Wattage/ efficiency, Quantity, date of manufacture to be identified on each sachet. Total quantity of cells in each carton to be displayed. Each pallets shall have marking of BHEL PO No. and item description etc. for traceability.	COC	v	P W	

LEGEND: *D: RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY VENDOR IN QA DOCUMENTATION.
 ** M: MANUFACTURER/SUB-VENDOR, B: BHEL/BHEL NOMINATED INSPECTION AGENCY
 P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE
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 AQL*: SINGLE SAMPLING PLAN AS PER ISO: 2859-1 / IS: 10673-1983, GENERAL INSPECTION LEVEL - 2, AQL 0.65

FOR BHEL USE		
DOC. NO.:	REV.....	CAT.....
<i>Re: acceptance</i>	<i>04</i>	
REVIEWED BY: MM	APPROVED BY: MK	QUALITY ASSURANCE



 BHEL-SBD	SOLAR BUSINESS DIVISION BENGALURU – 560012, INDIA Purchase Specification Group : Photovoltaic Module		DOC. NO: PS-901-05-0018			
	REV. 04	JOB NO.- STD.				
	PAGE 01 OF 03	DT 02.03.21				
<u>SILICON SOLAR CELL – MULTI CRYSTALLINE 5 BUS BAR</u>						
1.0 PHYSICAL CHARACTERISTICS						
COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.	SI No.	Description	Parameter			
	1.01	Cell Model Number	(vendor to indicate model no. of Solar cell being offered)			
	1.02	Material	Multi (Poly) Crystalline Silicon			
	1.03	Busbar	Five (5) Bus bar			
	1.04	Dimensions (mm)	157 ± 0.5 x 157 ± 0.5 mm			
	1.05	Thickness (microns)	200 ± 20			
	1.06	Diagonal	Diagonal variation shall not be more than 0.5 mm			
	1.07	Cell Power Wattage (Wp)	≥ BHEL required wattage (Negative tolerance not allowed)			
	1.08	Soldering peel strength (N/mm)	≥ 1.0 Front (Across each Busbar) ≥ 1.5 Back (Across each Busbar)			
	1.09	Cell bow (mm)	< 1.0			
	1.10	Shape	Square			
	1.11	Metallization	<ul style="list-style-type: none"> ▪ Front - Silver ▪ Back - Silver Bus bar with Aluminum BSF 			
	1.12	PID Resistant	Cell shall be 100% PID Resistant.			
1.13	Anti-Reflection coating	PECVD - Silicon Nitride (Blue Color)				
2.0 TYPICAL I-V CHARACTERISTICS						
SI No.	Pmax (Wp)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)	Fill Factor (%)
1	4.82	0.595	9.782	0.698	9.998	83.40
2	4.80	0.594	9.764	0.697	9.997	83.24
3	4.78	0.594	9.731	0.697	9.991	83.34
4	4.76	0.594	9.685	0.696	9.991	82.55
5	4.74	0.593	9.680	0.696	9.990	82.55
6	4.72	0.593	9.646	0.695	9.985	82.43
7	4.70	0.593	9.628	0.693	9.983	82.39
8	4.68	0.592	9.595	0.692	9.982	82.27
9	4.67	0.592	9.595	0.685	9.980	82.25
10	4.65	0.591	9.544	0.680	9.978	82.12
11	4.63	0.591	9.526	0.689	9.975	81.92
*संख्या: 414597/2021/SBD-SPV, संशोधन संख्या: -110049 पंजीकृत कार्यालय: सीएचईएल हाउस, नई दिल्ली-110049, REGD.OFFICE: BHEL HOUSE SIRFORT, NEW DELHI- 110049						

 BHEL-SBD	SOLAR BUSINESS DIVISION BENGALURU – 560012, INDIA Purchase Specification Group : Photovoltaic Module		DOC. NO: PS-901-05-0018																																																																																							
			REV. 04	JOB NO.- STD.																																																																																						
			PAGE 02 OF 03	DT 02.03.21																																																																																						
COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.	<table border="1"> <thead> <tr> <th>Sl No.</th> <th>Pmax (Wp)</th> <th>Vmp (V)</th> <th>Imp (A)</th> <th>Voc (V)</th> <th>Isc (A)</th> <th>Fill Factor (%)</th> </tr> </thead> <tbody> <tr><td>12</td><td>4.62</td><td>0.539</td><td>8.571</td><td>0.635</td><td>9.076</td><td>80.16</td></tr> <tr><td>13</td><td>4.61</td><td>0.539</td><td>8.553</td><td>0.635</td><td>9.059</td><td>80.14</td></tr> <tr><td>14</td><td>4.60</td><td>0.538</td><td>8.550</td><td>0.635</td><td>9.040</td><td>80.13</td></tr> <tr><td>15</td><td>4.59</td><td>0.538</td><td>8.532</td><td>0.635</td><td>9.023</td><td>80.11</td></tr> <tr><td>16</td><td>4.58</td><td>0.538</td><td>8.513</td><td>0.635</td><td>9.004</td><td>80.10</td></tr> <tr><td>17</td><td>4.57</td><td>0.537</td><td>8.510</td><td>0.635</td><td>8.986</td><td>80.09</td></tr> <tr><td>18</td><td>4.56</td><td>0.537</td><td>8.492</td><td>0.635</td><td>8.967</td><td>80.08</td></tr> <tr><td>19</td><td>4.55</td><td>0.537</td><td>8.473</td><td>0.635</td><td>8.949</td><td>80.07</td></tr> <tr><td>20</td><td>4.54</td><td>0.537</td><td>8.454</td><td>0.635</td><td>8.930</td><td>80.06</td></tr> <tr><td>21</td><td>4.53</td><td>0.537</td><td>8.436</td><td>0.635</td><td>8.913</td><td>80.04</td></tr> <tr><td>22</td><td>4.52</td><td>0.536</td><td>8.433</td><td>0.634</td><td>8.911</td><td>80.01</td></tr> </tbody> </table>						Sl No.	Pmax (Wp)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)	Fill Factor (%)	12	4.62	0.539	8.571	0.635	9.076	80.16	13	4.61	0.539	8.553	0.635	9.059	80.14	14	4.60	0.538	8.550	0.635	9.040	80.13	15	4.59	0.538	8.532	0.635	9.023	80.11	16	4.58	0.538	8.513	0.635	9.004	80.10	17	4.57	0.537	8.510	0.635	8.986	80.09	18	4.56	0.537	8.492	0.635	8.967	80.08	19	4.55	0.537	8.473	0.635	8.949	80.07	20	4.54	0.537	8.454	0.635	8.930	80.06	21	4.53	0.537	8.436	0.635	8.913	80.04	22	4.52	0.536	8.433	0.634	8.911	80.01
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<p>Note : Above I-V datas are typical values at irradiance 1000 W/m² with AM 1.5 spectrum, Cell temperature 25^o C, Test method according to IEC 60904-1.</p>																																																																																										
<p>3.0 MECHANICAL, VISUAL & ELECTROLUMINESCENCE (EL) CHARACTERISTICS:</p>																																																																																										
<p>3.1 The cells shall be of 'A' category without any Visual defects.</p>																																																																																										
<p>3.2 Cell should not have any edge chips or any visible crack or deep scratches.</p>																																																																																										
<p>3.3 Cell should not have any printing defects. Cells shall not have any misalignment (of bus-bars) on the either surface. Cells must have precise printing & superior silver contacts for ease of automatic soldering.</p>																																																																																										
<p>3.4 Cell should not have print shift, finger knots other printing defects of more than 0.5 mm on width and 3.0 mm on length.</p>																																																																																										
<p>3.5 Cell shall not have bus bar or grid line interruptions, finger print interruptions, finger breaks, stains or paste smudges on either surface etc.</p>																																																																																										
<p>3.6 Cells shall have homogenous Silicon Nitride coating. There shall not be any colour variations.</p>																																																																																										
<p>3.7 Bus line Silver shall not be tarnished or oxidized.</p>																																																																																										
<p>ಕೊಡು, ಕೋಡು: ಬಹುಭಾರತೀಯ ವಿದ್ಯುತ್, ಸಂಸ್ಥೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದ -110049 ನವೀಕರಣ ಕಾರ್ಯಾಲಯ, ಶಿವಪುರ, ಹೌಸ್, ನವ ದೆಹಲಿ-110049, REGD.OFFICE : BHEL HOUSE SIRIFORT, NEW DELHI- 110049</p>																																																																																										

	 BHEL-SBD	SOLAR BUSINESS DIVISION BENGALURU – 560012, INDIA Purchase Specification Group : Photovoltaic Module	DOC. NO: PS-901-05-0018
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		3.8 Cell shall not have Micro Crack, Dark Area, Dark Spot & Dead cell.	
		4.0 PACKING CONDITIONS:	
COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.		4.1 Cell shall be vacuum / air tight packed with heat shrinkable sleeve or polythene / polypropylene sachets of not more than 125 cells per sachet.	
		4.2 Sachets shall be packed in foam / thermocol boxes with soft pads on both ends or in polyethylene foam packing to absorb transit handling shocks.	
		4.3 Packing of sachets shall be in carton boxes with soft spacers & bubble wrap.	
		4.4 The final packing shall be with suitable pallet for mechanised handling.	
		4.5 Manufacturer name, Cell type, Lot number, Wattage/ efficiency, Quantity, date of manufacture to be identified on each sachet. Total quantity of cells in each carton to be displayed.	
	4.6 Each pallets shall have marking of BHEL PO No. and item description etc. for traceability.		
	5.0 TEST CERTIFICATE / REPORTS / COC:		
	5.1 Each lot must be accompanied with routine Test Certificate, for the parameters described in clause from 1.04 to 1.08 of section 1.0.		
	5.2 Certificate Of Compliance (COC) for each point mentioned under section 1.0, clause no. 1.02 to 1.03, 1.09 to 1.13, section 3.0 & section 4.0 shall be provided along with each lot.		
	6.0 INSPECTION CRITERIA :		
	6.1 Visual inspection, Dimensional & Electrical characteristics : Single Sampling Plan as per ISO: 2859-1 / IS: 10673-1983, General Inspection Level - 2, AQL 0.65		
	6.2 Solder peel strength : Single Sampling Plan as per ISO: 2859-1 / IS: 10673-1983, Special Inspection Level - I, AQL 1.5		
		REGD. OFFICE: भारतीय भारत भारत, 3,0000000, नई दिल्ली-110049, REGD.OFFICE: BHEL HOUSE SIRIFORT, NEW DELHI- 110049	

Item : Solar Cells TECHNICAL PQR
Qty. : 1513000 numbers

PQR		
S No.	Description	Bidder's Confirmation (Yes / No)
1	The offer shall be submitted by DCR Solar cell original manufacturer/Dealer/ Representative. In case of Dealer/Representative, a valid authorization certificate to be submitted from the cell manufacturer. If the Bid is submitted by both manufacturer and Dealer, the bid of manufacturer will only be valid.	Manufacturing Plant location: (Name of original Solar Cell manufacturer, complete address & contact details)
2	Vendor shall be able to supply 78 Mw/ annum DCR make Solar PV cells.	Self-declaration by Vendor.
3	Vendor should have supplied at least 25, 00,000(Two and half million) pieces of solar cells to PV modules manufacturers in last 3 years.	Documentary evidence to be provided (PO copy or Client certificate)
4	Vendor should have an established quality assurance system and should have valid ISO 9001:2008/2015 certification for QMS.	Confirm and furnish copy of ISO 9001 certificate
BHEL RESERVES THE RIGHT FOR INDEPENDENT VERIFICATION OF THE CLAIMS MADE FOR CONFORMANCE TO THE PRE-QUALIFICATION CRITERION. BIDDERS TO ENSURE PROVIDING AUTHENTIC CERTIFICATES / DOCUMENTATION AND CREDENTIALS IN ORDER TO QUALIFY FOR BHEL TENDER PROCESS.		

 	SOLAR BUSINESS DIVISION (SBD)	SPECIAL CONDITIONS OF CONTRACT (SCC) Rev. No. 00	Item Description: : Solar Cell (Multi) 5BB 4.67Wp TENDER REF. MSC12302481
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<p>These Conditions shall be read in conjunction with General Condition of Contract (GCC Rev R0) enclosed along with the tender enquiry. In case of any conflict or inconsistency, the requirement of SCC shall prevail over the GCC.</p>		
<p>The name of our Plant/ Unit may please be read as SOLAR BUSINESS DIVISION (SBD) as it was changed from ELECTRIC & PHOTOVOLTAIC DIVISION (EPD)</p>		
1.	Type of Contract	Supply
2.	Item Details	Solar Cell (Multi) 5BB 4.67Wp
3.	Consignee address	STORES INCHARGE BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION (SBD) FORMERLY KNOWN AS ELECTRIC & PHOTOVOLTAIC DIVISION (EPD) PROF. CNR RAO CIRCLE, SCIENCE INSTITUTE POST, MALLESWARAM, BANGALORE-560012. Consignee address in LR should be strictly as per above.
4.	Buyer and Paying Authority	BHARAT HEAVY ELECTRICALS LIMITED - SOLAR BUSINESS DIVISION (SBD), BANGALORE. (Formerly known as ELECTRIC & PHOTOVOLTAIC DIVISION)
5.	Buyer IEC CODE/ GST No.	IEC CODE: 0588138690 / GST No: 29AAACB4146P1ZB
6.	Buyer Email ID	For Commercial Clarifications: spankaj@bhel.in ; manjunath.rao@bhel.in ; For Technical Clarifications: raghavendrabadu.gv@bhel.in ; subirroy@bhel.in ;
7.	Mode of Dispatch	By Road/Sea. Note: It is Vendor's responsibility to ensure availability of Trucks/Ships schedule etc. well in advance for dispatch of material to meet contractual delivery requirement. <ul style="list-style-type: none"> • Part shipment is allowed. • Transshipment is not allowed. It is also the vendor's responsibility to ensure material is dispatched through shortest possible route. By ROAD/AIR/SHIP
8.	Price basis	Indigenous purchase – Price to be quoted on Ex-WORKS, inclusive of packing & forwarding charges. Taxes and duties to be paid in line with GCC. Material to be dispatched on freight pre-paid basis to BHEL SBD. Price to be quoted as per attached format (Unpriced Price Bid). All the other applicable taxes including Income taxes (TDS) as per prevailing Indian law shall be deducted from the payables & paid to Govt. by BHEL..
9.	Evaluation of Offer	On Overall basis as per Cl. No. 19.0 of GCC (Instructions to bidders). Any new taxes/ duties structure as and when implemented by the Government shall become applicable & evaluation shall be done based on the new taxes/ duties structure.
10.	Price Variation	Not Applicable. Prices shall be firm till the completion of contract.
11.	Change of Scope	In case of changes in scope of the tender and/ or technical specifications and commercial terms & conditions by BHEL during techno commercial evaluation and before Price bid Opening, the same will be communicated only to the bidders who have participated in the tender. The techno-commercially qualified bidders shall be asked to submit Impact Price bid, as applicable.