

Bharat Heavy Electricals Ltd.,

(A Government of India undertaking)

Electronics Division


PB No.2606, Mysore Road, Bangalore-560026, India

Sealed quotations are invited under two part bid system for manufacturing and supply of 157 mm Multi Black MCCE Silicon Wafer ras per BHEL technical specification.

| | |
|--|--|
| RFQ NO and date | MDSSCPV051 dated 01.06.2019 |
| RFQ due date & time | 17.06.2019 up to 13.00 hrs (IST) |
| Date, Time & Venue of Part-I Bid Opening | 17.06.2019 after 13.30 hrs (IST) New Engineering Building 2nd Floor Bharat Heavy Electricals Limited PB NO 2606, Mysore road, Bangalore-560 026. INDIA |
| Date, Time & Venue of Price Bid opening | Will be intimated later for technically accepted vendors |
| Address for Communication & Contact Person in BHEL | Mr. Muhammed Shakir/ Mr. Ramachandra, SC&PV MM Department, BHEL Electronics Division, PB NO 2606, Mysore road, Bangalore-560 026. INDIA Email: muhammedshakir@bhel.in , ramachandra@bhel.in Telephone number: +91 80 26989665, +91 80 26998476 |

Signature of Tenderer with Seal

REQUEST FOR QUOTATION

| | | | |
|--|---|--|---|
|  | BHARAT HEAVY ELECTRICALS LIMITED Electronics Division PB No. 2606, Mysore Road Bangalore - 560026 INDIA | RFQ NUMBER: MDSSCPV051 RFQ DATE : 01.06.2019 | Due Date/Day: 17.06.2019 MON Time : 13:00 HRS Tender Box : Reception Area Opening Venue: NEW ENGG. BLDG |
| MMI:PU:RF:003 | (address for communication) : | | (for all correspondence) |
| | | Purchase Executive : MUHAMMEDSHAKIR M K Phone : 080 26989665 Fax : E-mail: muhammedshakir@bhel.in | |

| SI No. | Description | Qty | Unit | Delivery qty | Delivery Date |
|--------|--|--------|------|------------------|--------------------------|
| 1 | PV0679040501 157 mm Multi Black MCCE Silicon Wafer * HSN/SAC : 3818 Doc No.- PS439411 Rev - 00 Test Certificate | 20,000 | NO | 10,000 10,000 | 31.07.2019 31.07.2019 |

Total Number of Items - 1

- 1.
- 2.

TWO PART BID - SUBMIT TECHNICAL AND PRICE BID IN SEPARATE SEALED COVERS

NOTES:

1. This RFQ is governed by:
 - a) INSTRUCTIONS TO BIDDERS/SELLERS and GENERAL CONDITIONS OF CONTRACT FOR PURCHASE available at <http://edn.bhel.com> (**RFQ-PO Terms & Conditions**)
 - b) Any other specific Terms and Conditions mentioned.
 2. Bidders / Representatives who would like to be present during opening of offers are required to furnish authorization letter for the same.
- * The HSN/SAC no mentioned against the line items in the RFQ are indicative only.

For and On behalf of BHEL.

MUHAMMEDSHAKIR M K
Semiconductors & Pho

1 OF 1



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**PURCHASE SPECIFICATION
GROUP : PHOTOVOLTAICS**

PS- 439 - 411

REV. 00

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TECHNICAL SPECIFICATION

1. MATERIAL : 157 mm Square Diamond Wire Saw
Multi Crystalline Black (MCCE) Silicon wafer

2. APPLICATION : It is used as starting material for Solar Photovoltaic cells production.

| SL. NO. | CHARACTERISTICS | VALUE | UNIT | TESTING METHODS / REF. STANDARDS. |
|---------|-----------------|-------|------|-----------------------------------|
|---------|-----------------|-------|------|-----------------------------------|

| | | | | |
|-----|-------------------------------|--|--|----------------|
| 1.0 | Base Wafer | Diamond Wire Saw | | Unaided Visual |
| 1.1 | Surface Treatment | Metal Catalysed Chemical etching (MCCE) on one side for making it as Black Silicon Wafer | | |
| 1.2 | Textured Surface Reflectivity | 17.5 % ± 2.5 % | | |

1.3 SURFACE CONDITION

Wafers shall be free from surface stains, water marks, chips, breakages and pin holes. MCCE etching done on one side.

| | | | | |
|-----|-----------------|--------------|--|--|
| 1.4 | SAW MARKS DEPTH | <=15 microns | | Visual inspection and surface profiling. |
|-----|-----------------|--------------|--|--|

2.0 DIMENSIONS

| | | | | |
|-----|---------------------|----------------|--|-------------------------|
| 2.1 | Size (Side to Side) | 157±0.25 mm | | Vernier/Go-No Go gauges |
| 2.2 | Shape | Square | | |
| 2.3 | Thickness | 180±20 microns | | ASTM-F533 |

| | | | | |
|-----|---------------------------------|--------------|--|-----------|
| 2.4 | TTV (Total Thickness Variation) | <=30 microns | | ASTM-F533 |
|-----|---------------------------------|--------------|--|-----------|

| | | | | |
|-----|-----|--------------|--|-----------|
| 2.5 | BOW | <=50 microns | | ASTM-F534 |
|-----|-----|--------------|--|-----------|

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Rev. 00

APPROVED BY :

SR 

PREPARED

SC 

ISSUED

Engg.

DATE

16-05-2019



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PURCHASE SPECIFICATION GROUP : PHOTOVOLTAICS

PS- 439 - 411

REV. No. 00

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3.0 CHARACTERISTICS

| | | | |
|-----|----------------------|--|------------------|
| 3.1 | TYPE | P(Boron, Gallium doped) | ASTM-F42 |
| 3.2 | RESISTIVITY | 0.8 – 2.0 ohm.cm | Four point probe |
| 3.3 | OXYGEN CONCENTRATION | $\leq 5 * 10^{17}$ Atoms/CM ³ | ASTM-F121 |
| 3.4 | CARBON CONCENTRATION | $\leq 8 * 10^{17}$ Atoms/CM ³ | ASTM-F123 |
| 3.5 | Brick Life time | ≥ 5 micro seconds | ASTM F28-91 |

4.0 PACKING

1. Wafers shall be packed in carton box with proper paddings to absorb transit handling shocks.
2. Each carton box shall have 100 nos. of wafers with a label giving manufacturer name, quantity and wafer characteristics.
3. The small carton boxes containing 100 nos. each of wafers shall be packed in a bigger carton box with foam fitments (cushions) on all the sides.
4. Each lot must be accompanied with a test certificate certifying the wafer characteristics.

5.0 NOTE

1. Wafers shall be free from edge chips, cracks, micro cracks, pin holes, stains, water marks and any other contamination.
2. Supplier shall replace free of cost the defective wafers found in the packets at the time of actual processing of the wafers into solar cells.

6.0 SAMPLING SIZE FOR INSPECTION AT BHEL

I. Visual Inspection :

Single Sampling Plan as per IS:10673-1983, General Inspection Level I, AQL 1.0 %.

II. Dimension and Resistivity measurement :

Single Sampling Plan as per IS:10673-1983, Special Inspection Level S-4, AQL 2.5 %.

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RFQ No. : MDSSCPV051 dated 01.06.2019

Supplier Name :

Offer Ref :

Contact Details :

Registered Office:-

Address :

Telephone No. :

Email :

Manufacturing plant:-

Address :

Telephone No. :

Email :

Ordering party (To be filled if different from Manufacturer)

Address :

Telephone No. :

Email :

Contact person :-

Name :

Office Address :

Telephone No. :

Mobile No. :

Email :

Contact person in India (if any) :-

Name:

Office Address :

Telephone No. :

Mobile No. :

Email :

Signature of Tenderer with Seal

Pre Qualification Criteria

| PQC Criteria | | |
|---------------------|--|---|
| | Particulars | Bidder's Confirmation |
| 1 | The offer shall be submitted only by the original MCCE multi crystalline silicon wafer manufacturers. | Name of original MCCE multi crystalline silicon wafer manufacturer, complete address & contact details with email address, website. |
| 2 | Vendor should have supplied at least 100,000 pieces of 156.75/157 mm MCCE multi crystalline high efficiency solar silicon wafers to Indian Solar Cell manufacturers during the period from 1.1.2018 to 30.04.2019. | Documentary evidence to be provided (PO copy, delivery details, AWB, Packing List, etc) |
| 5 | MCCE Multi Crystalline silicon wafers supplied shall be suitable for processing solar cells with average cell efficiency $\geq 18.8\%$. | Documentary evidence to be provided in the form of certificate / e-mail from Indian Client for obtaining $\geq 18.8\%$ average solar cell efficiency. |
| TECHNICAL | | |
| Sl. No. | Particulars | Bidder's Confirmation (Acceptable / Not Acceptable) Please indicate deviations, if any. |
| 1. | Silicon Wafer as per BHEL Technical Specification 157 mm Multi Black MCCE Silicon Wafer offered shall comply as per BHEL Technical Specification PS 439 411 REV 00 | Please confirm |
| 2. | Certificate of conformance/ Test report to be issued for each lot mentioning technical details and the same to be shared with BHEL before material dispatch, thus to obtain clearance from BHEL for shipment. The Certificate of conformance/ Test report shall mention BHEL Purchase Order Number, invoice number and quantity supplied. | Please confirm |

Signature of Tenderer with Seal

| COMMERCIAL | | |
|-------------------|--|---|
| Sl. No. | Particulars | Bidder's Confirmation Please indicate deviations, if any. |
| 1 | Currency of offer: Please specify the currency of your offer | |
| 2. | Terms of Payment | |
| | i) For Foreign Vendors a. BHEL standard payment term is 100% sight draft with 45 days credit, | Please confirm |
| | ii) For Indian Vendors BHEL standard payment term is 100% payment with 45 days credit, | Please confirm |
| 3. | Terms of Delivery | |
| | i) For Foreign Vendors CIP Bangalore Airport | Please confirm |
| | ii) For Indian Vendors Door Delivery to BHEL Stores, Bangalore with Freight and Insurance paid | Please confirm |
| 4. | Country of origin: Please specify country of origin. | Country of origin: |
| 5. | Validity: Quotation should remain valid for 45 days from the RFQ due date. | Quotation Validity : |
| 6. | Delivery Schedule required by BHEL: BHEL requires delivery within 4 weeks from PO date. | Vendor delivery schedule : |

Signature of Tenderer with Seal

| | | |
|-----|---|---|
| 7 | <p>Penalty for delayed delivery: 0.5 % per week for undelivered portion subject to a maximum of 10 %. Loading factor will be applicable for non-acceptance of penalty clause, Non- Acceptance: 10% Partial Acceptance (X%): (10- X)%</p> | Acceptable / Not Acceptable |
| 8. | <p>Price basis: Price is to be quoted on per wafer basis. Purchase order will be placed on number of wafer basis. L1 (Lowest Price) vendor shall be evaluated by BHEL on price per wafer basis.</p> | Please confirm |
| 9. | <p>BHEL Guidelines for Indian Agents of Foreign Suppliers: Supplier shall adhere to “BHEL Guidelines for Indian Agents of Foreign Suppliers “in case the supplier has Indian Agent.</p> | Acceptable / Not Acceptable |
| 10. | <p>Acceptance of Reverse Auction: BHEL EDN reserves the right to adopt Reverse Auction at any point of time after technical evaluation, at its discretion. BHEL may also open the price bids at its discretion.</p> | Acceptable / Not Acceptable |
| 11 | <p>Taxes and Duties: (To be filled by Indian vendors) Please indicate percentage of applicable taxes and duties Please specify whether the unit price offered is inclusive/ exclusive of taxes and duties</p> | GST: Others if any (please specify): Inclusive/ Exclusive |
| 12 | <p>Eligibility under Preference to Make in India Order: For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017 & 28.05.2018 and subsequent orders. Please specify if you are eligible to claim the benefits of Indian vendor for supply of PV Modules to BHEL against Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017. If yes, the required documents evidencing the eligibility as per the order, has to be submitted."</p> | Yes/No, If yes, required documents to be submitted |

Place:

Date:

Signature of Tenderer with Seal

UNPRICED BID

RFQ No. : MDSSCPV051 dated 01.06.2019
Supplier Name :
Offer Ref :

| Sl. No. | Item Description | Quantity offered | Currency |
|----------------|--|-------------------------|-----------------|
| 1 | 157 mm Multi Black MCCE Silicon Wafer offered shall comply as per BHEL Technical Specification PS 439 411 REV 00 | 10,000 Nos | |

NOTE:

1. Technical and commercial terms shall be as per techno-commercial bid.

Place:

Date:

Signature of Tenderer with Seal

PRICE BID

RFQ No. : MDSSCPV050 dated 01.06.2019

Supplier Name :

Offer Ref :

| Sl. No. | Item Description | Quantity offered | Price per No | Currency |
|----------------|--|-------------------------|---------------------|-----------------|
| 1 | 157 mm Multi Black MCCE Silicon Wafer offered shall comply as per BHEL Technical Specification PS 439 411 REV 00 | 10,000 Nos | | |

NOTE:

2. Technical and commercial terms shall be as per techno-commercial bid.

Place:

Date:

Signature of Tenderer with Seal

SPECIAL TERMS

This RFQ is also governed by INSTRUCTIONS TO BIDDERS/SELLERS and GENERAL CONDITIONS OF CONTRACT FOR PURCHASE available at <http://edn.bhel.com> (RFQ-PO Terms & Conditions). The special terms and conditions mentioned below supersedes the general conditions of contract Doc No. BHEL:EDN: GCC- SHOP: REV01, for contradictory clauses if any.

1. Quotation shall be submitted in two part bid

Part 1: Unpriced offer i.e. "Techno-commercial Bid" with filled in BHEL Standard commercial terms and conditions along with purchase specification, integrity pact, etc if any in a sealed envelope and must be super scribed as "**Techno-commercial Bid**" and **RFQ number**.

Part 2: Priced offer i.e. "Price Bid" containing price summary in a separate sealed envelope and must be super scribed "**Price Bid**".

Both these envelopes shall be enclosed in a single sealed envelope super scribed with RFQ number and due date of tender and any other details as called for in the tender document

2. BHEL standard terms of payment

For Indian bidders:

100% sight draft with 45 days credit,

For foreign bidders:

100% open credit with 45 days credit,

Note: Deviated payment terms and corresponding loading factors mentioned in clause I (ii) of instructions to bidders (DOC No. BHEL: EDN: ITB- SHOP: REV 03), are not applicable for this tender.

3. Terms of delivery :

CIP Bangalore Airport (For foreign bidders)

Door Delivery to BHEL EDN Stores, Bangalore with Freight and Insurance paid.

4. Price is to be quoted on per wafer basis. Purchase order will be placed on number of wafer basis. L1 (Lowest Price) vendor shall be evaluated by BHEL on price per wafer basis.

5. Delivery Schedule: BHEL requires delivery within 4 weeks from PO date.

6. Evaluation of offers: L1 vendor (lowest Bidder) will be decided based on 'Cost to BHEL' value after considering the applicable loading factors and other costs including packing & forwarding, applicable duties including safeguard duty, taxes, etc if it is in the scope of BHEL.

7. Changes in Statutory Levies: If any rate of Tax are increased or decreased, a new tax is introduced, an existing tax is abolished or any change in interpretation or application of any tax occurs in the course of execution of the contract within the contractual delivery period, which was or will be assessed on the bidder in connection with performance of the contract, an equitable adjustment of the contract price or deduction there from, as the case may be. However, these adjustments would be restricted to direct transactions between BHEL and the bidder/ agent of foreign bidder (if applicable). These adjustments shall not be applicable on procurement of raw materials, intermediary components, etc. by the bidder/ agent.

- 8.** In case of **changes in scope of the tender** and/ or technical specifications and commercial terms & conditions by BHEL during techno commercial evaluation, the same will be communicated only to the bidders who are participated in the tender. The techno-commercially qualified bidders will be asked for submitting impact price bid, if any is applicable as per BHEL purchase policy and guidelines.

- 9. Preference to Make in India:** For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017 & 28.05.2018 and subsequent Orders issued by the respective nodal ministry shall be applicable even if issued after issue of this NIT but before finalization of contract/PO /WO against this this NIT. In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and/ or local content in respective of this procurement, same shall be applicable.

- 10.** Offers with non-acceptance of BHEL terms, are liable for **rejection**.
