

	<p style="text-align: center;">INDIAN INSTITUTE OF TECHNOLOGY MADRAS Chennai 600 036</p> <p>Telephone: [044] 2257 9798/9723 FAX: [044] 2257 4855 E-mail: arpp@iitm.ac.in</p>	
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V. Sathyanarayanan
Senior Manager (Project Purchase)

Ref: PHY/JKRA/005/2018
Date: 24.10.2018

Open Tender No: PHY/JKRA/005/2018

Due Date: 14th November 2018, 3pm

Pre-Bid meeting: - Not required.

Technical Bid opening meeting on 14th November 2018, 4:00 PM at Department of Physics, IIT-Madras.

Dear Sir/Madam,

On behalf of the Indian Institute of Technology Madras, offers are invited for the supply of **“Silicon Wafer Grinding Machine”** conforming to the specifications given in Annexure I.

Vendor who can supply and integrate the above equipment alone need to respond to the tender please.

Instructions to the Bidder

- I. **Preparation of Bids:** - The tenders should be submitted under two-bid system (i.e.) Technical bid and Financial bid.
- II. **Delivery of the tender:** - The tender shall be sent to the addresses mentioned below, either by post or by courier so as to reach our office before the due date and time specified in our schedule. The offer/bid can also be dropped in the tender box on or before the due date and time specified in the schedule.
The tender box is kept in the office of the:

**Senior Manager,
Project Purchase,
IC & SR Building 2nd floor,
I.I.T. Madras,
Chennai - 600 036.**

In case of foreign vendors, the technical and the financial bids may be sent as separate files (with password protection) along with other required documents to smipur-icsr@iitm.ac.in Both the bids must have tender reference number mentioned clearly. Password should send at least one day prior to the tender opening date.

- III. **Opening of the tender:** - The offer/bids will be opened by a committee duly constituted for this purpose. The technical bids will be opened first and will be examined by a technical committee which will decide the suitability of the bids as per our specifications and requirements. All bidders will be invited for opening of the technical bids. With respect to opening the financial bid, only technically qualified bidders will be called.

- IV. Prices:** - The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges to the **Department of Physics**. The offer/bid should be exclusive of taxes and duties. The percentage of tax & duties should be clearly indicated separately. Kindly note that IIT Madras is eligible for concessional GST and relevant certificate will be issued.

In case of import supply, the price should be quoted without custom duty. IIT Madras is exempted from levy of IGST on Imports and eligible for concessional custom duty (not exceeding 5%) and the price should be quoted on EX-WORKS and CIP basis indicating the mode of shipment.

- V. Agency Commission:** - Agency commission, if any, will be paid to the Indian agents in rupees after receipt of the equipment and its satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in the tender document even in the case of 'Nil' commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent. The foreign Principal should indicate the percentage of payment and it should be included in the basic price quoted originally (if any)..
- VI. Terms of Delivery:** - The item should be supplied to the **Department of Physics, IIT Madras** as per the Purchase Order. In case of import supply, the item should be delivered at the cost of the supplier to our Institution. The Installation/Commissioning should be completed as specified in our important conditions.
- VII. Technical Bid Opening:** The technical bid will be on 14th November 2018, 4:00 PM at the **Department of Physics, IIT-Madras**. The financial bids of those tenders who are technically qualified will be opened at a later date under intimation to them.
- VIII. IIT Madras** reserves the full right to accept / reject any tender at any stage without assigning any reason.

Yours sincerely,

V. Sathyanarayanan
Senior Manager (Project Purchase)
IC&SR Building, I.I.T. Madras,
Chennai - 600 036.

SCHEDULE

Important Conditions of the tender

1. The due date for the submission of the tender is **14.11.2018, 3 pm.**

The offers / bids should be submitted in two bids systems (i.e.) Technical bid and financial bid. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes, transportation, packing & forwarding, installation, guarantee, payment terms, pricing terms etc. The Technical bid and financial bid should be put in separate covers and sealed. Both the sealed covers should be put in a bigger cover. The Open Tender for supply of **“Silicon Wafer Grinding Machine”** should be written on the left side of the Outer bigger cover and sealed.

2. **EMD: - The EMD in the form of account payee DD for 2% value of the item in favor of Registrar IIT Madras should be enclosed in the cover containing financial bid.** Any offer not accompanied with the EMD shall be rejected summarily as non-responsive.

(However, in case the Bid security is more than a threshold (Rupee five lakh) and in case of foreign bidders in GTE tenders it may also be allowed in the form of a bank guarantee (in equivalent Foreign Exchange amount, in case of GTE) issued/confirmed from any of the scheduled commercial bank in India in an acceptable form, and so on, safe guarding the purchaser's interest in all respects.)

The EMD of the unsuccessful bidders shall be returned within 30 days of the end of the bid validity period. The same shall be forfeited, if the tenderers withdraw their offer after the opening during the bid validity period. The Institute shall not be liable for payment of any interest on EMD. EMD is exempted for Micro and Small Enterprises (MSE) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) or registered with the Central Purchase Organization or with IIT Madras as on the date of submission of bids.

When no local agent, the foreign vendor can submit demand draft equal to 2% or wire transfer the amount to our account as detailed in the attachment (Annexure II) and enclose the proof with the financial bid.

3. **Performance Security: -** The successful bidder should submit Performance Security for an amount of 5% of the value of the contract/supply. The Performance Security may be furnished in the form of an Account Payee DD, FD Receipt from the commercial bank, Bank Guarantee from any nationalized bank in India. **The performance security should be furnished within 21 days from the delivery of the purchase order.**

Performance Security in the form of Bank Guarantee:- In case the successful bidder wishes to submit Performance Security in the form of Bank Guarantee, the Bank Guarantee should be routed through the Beneficiary Bank to the end user bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee from a Nationalized Bank of India.

The Bank Guarantee should remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including the warranty obligations.

4. **Indian agent:** If an Indian agent is involved, the following documents must be enclosed:
Foreign principal's proforma invoice indicating the commission payable to the Indian Agent and nature of after-sales service to be rendered by the Indian Agent.
 - ✓ Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.

5. The offer/bids should be sent only for a machine that is available in the market and supplied to a number of customers. A list of customers in India and abroad with details must accompany the quotations. Quotations for a prototype machine will not be accepted.
6. Original catalogue (not any photocopy) of the quoted model duly signed by the principals must accompany the quotation in the Technical bid. No prices should ever be included in the Technical bid.
7. Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.
8. **Validity:** Validity of Quotation not less than 90 days from the due date of tender.
9. **Delivery Schedule:** - The tenderer should indicate clearly the time required for delivery of the item (subjected to the executive committee-IITMadras approval). In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied.
If there is delay, the penalty will be @1% per week of delay subject to a max of 10% of the value of purchase order and if the delay is more than accepted time frame by IITM, the PO would be cancelled and liquidated damages will be enforced.
10. **Risk Purchase Clause:-** In the event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from other sources on the total risk of the supplier under risk purchase clause.
11. **Payment:-**
 - (i) No Advance payment will be made for Indigenous purchase. However 90% Payment against Delivery and 10% after installation are agreed to wherever the installation is involved. In case of import supplies the payment will be made only through 100% Letter of Credit i.e. (90% payment will be released against shipping documents and 10% after successful installation wherever the installation is being done).
 - (ii) **Advance Payment:** No advance payment is generally admissible. In case of specific percentage of advance payment is required, the Foreign Vendor has to submit a Bank Guarantee equal to the amount of advance payment and it should be routed through the Beneficiary Bank to the end user Bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee through a Nationalized Bank of India.
12. **On-site Installation:** - The equipment or machinery has to be installed or commissioned by the successful bidder within 15 to 20 days from the date of receipt of the item at site of IIT Madras.
13. **Warranty/Guarantee:** - The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Normally the warranty should be for four years from the date of commissioning of the equipment. After the warranty of three years, the bidder should be willing to maintain the equipment further at an AMC rate which should be specified in the bid by the bidder. Also the manufacturer should give an undertaking to support the equipment for 5 years from the date of supply. Also no equipment which is not currently in production should be quoted. Any extended warranty offered for the same has to be mentioned separately (For more details please refer our Technical Specifications).
14. **Late offer:** - The offers received after the due date and time will not be considered. The Institute shall not be responsible for the late receipt of Tender on account of Postal, Courier or any other delay.
15. **Acceptance and Rejection:** - I.I.T. Madras has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.

16. **Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.**

17. Disputes and Jurisdiction:

Settlement of Disputes: Any dispute, controversy or claim arising out of or in connection with this PO including any question regarding its existence, validity, breach or termination, shall in the first instance be attempted to be resolved amicably by both the Parties. If attempts for such amicable resolution fails or no decision is reached within 30 days whichever is earlier, then such disputes shall be settled by arbitration in accordance with the Arbitration and Conciliation Act, 1996. Unless the Parties agree on a sole arbitrator, within 30 days from the receipt of a written request by one Party from the other Party to so agree, the arbitral panel shall comprise of three arbitrators. In that event, the supplier will nominate one arbitrator and the Project Coordinator of IITM shall nominate on arbitrator. The Dean IC&SR will nominate the Presiding Arbitrator of the arbitral tribunal. The arbitration proceeding shall be carried out in English language. The cost of arbitration and fees of the arbitrator(s) shall be shared equally by the Parties. The seat of arbitration shall be at IC&SR IIT Madras, Chennai.

- a. **The Applicable Law:** This Purchase Order shall be construed, Interpreted and governed by the Laws of India, Court at Chennai shall have exclusive jurisdiction subject to the arbitration clause.
- b. Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Chennai in Tamil Nadu.

20. All Amendments, time extension, clarifications etc., will be uploaded on the website only and will not be published in newspapers. Bidders should regularly visit the above website to keep themselves updated. No extension in the bid due date/ time shall be considered on account of delay in receipt of any document by mail.

Acknowledgement: - It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

**SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE
COMPANY WITH DATE**

Tender Notice for Silicon Wafer Single Side Surface Grinding Machine

Proposed Use of the Machine:

The system is to be purchased for superior surface grinding of silicon wafer to reduce its thickness over a batch of 500 per year. The silicon wafer to be machined will be monocrystalline silicon varying from 4" to 6". Total thickness will be reduced from 200 microns to 30 microns (minimum).

Input workpiece dimension:

- | | |
|----------------------------------|---------------------|
| 1) Material | : Silicon |
| 2) Maximum wafer size (diameter) | : up to 150 mm |
| 3) Initial Thickness | : up to 200 microns |

Output workpiece requirements:

- | | |
|---------------------------|---|
| 1) Output Thickness | : 30 to 70 microns (acc. to user requirement) |
| 2) Flatness | : less than 0.2 microns |
| 3) Surface roughness (Ra) | : less than 0.02 microns(with fine grinding) |
| 4) Thickness variation | : +/- 1.5 microns |

Technical Specifications:

(A) STANDARD MACHINE:

1	Machine structure	a) Machine should be fabricated from stress relieved and corrosion resistant material ensuring rigidity and low vibration operation.
2	Axis feed drive	a) High precision, high stiffness drives with almost zero backlash error. b) The vertical feed rate should range between 0.5 to 60 um/sec. c) The drive should be protected from the chips or debris. d) Active cooling of all the feed drives to maintain uniform temperature and reduce thermal effects. (See optional items 51)
3	Controller features	a) Number of axes, axis range and spindle speed should be compatible with the machine. b) Absolute or incremental programming with in-process thickness control should be available.
4	Spindle	a) The rotation of the grinding wheel should be smooth without any instant start/ stop. b) The halt in rotation of wheel must be by gradual reduction in RPM. c) The spindle rotation speed can be adjustable by the software.
5	Motor	a) High frequency motor of 4.2 kW or more output power.
6	Chuck table	a) The maximum size of the workpiece that the chuck table can handle should not be less than 8". b) 1 chuck table is sufficient.

7	Pressure System	<p>Pneumatic or hydraulic pressure must be provided for the proper load application on the machining component.</p> <p>The intensity of load must either be automatic controlled according to the material being machined or programmable as per the user requirement.</p> <p>Care should be taken for any uneven load during machining.</p>
8	Coolant	<p>a) Cooling fluid circulation must be provided to cool the spindle and other machining parts during operation.</p> <p>b) This system should also be provided with recirculation facility.</p>
9	Abrasive slurry dissipation	<p>a) Abrasive slurry mixture should be in homogenous conditions for the time and optimum usage should be emphasised.</p> <p>b) Automatic slurry dispensing option must be available.</p>
10	Operation Panel and indicators	<p>Machine should have a touch type display screen to show the various features like positioning of wheel, rpm of the spindle and the chuck table, pressure/load acting on the work material, Coolant flow supply, error message, running time display, peak electric current etc.</p>
11	Indicators or sensors features	<p>a) Special monitoring method to check the main air supply, vacuum pressure on the chuck table, the exhaust pressure, coolant water flow rate at spindle and wheel should be installed.</p> <p>b) Alarm or error indication to alert the operator in case any of the values of the above features doesn't match the recommended values or the values set by the operator.</p> <p>c) In-process thickness control using the height gauge should be provided.</p> <p>d) Automatic machine shutoff or warning in the event of lubrication or slurry mixture failure or spindle off condition.</p>
12	Calibration	<p>a) Machine should be calibrated in metric system based on JIS standard.</p> <p>b) Appropriate test charts to be supplied along with machine.</p>
13	Grinding	<p>a) The speed of grinding wheel should be programmable controlled using PID controller.</p> <p>b) Grinding pad should be able to produce the surface roughness of less than 0.02 microns with a flatness of less than 0.2 microns (~1 light band).</p>
14	Standard accessories	<p>a) All the standard accessories required for grinding should be included in the quotation.</p> <p>b) Mounting station for stable sub-micron thickness variation should be provided.</p> <p>c) Equipments for cleaning the Chuck and wafer should preferably be provided.</p>

		(See optional items 52)
15	Chip/debris collection	<p>a) Debris collection chamber should be provided at a suitable accessible location to collect the debris dust/smoke. (See optional items 54)</p> <p>b) The cleaning of the lap plate should be easy and time efficient.</p>
16	Power supply/ Air supply	<p>a) Machine should be operable using the Indian standard 3 phase AC power supply: equipment needed for any voltage conversion has to be supplied.</p> <p>b) Adequate protection against power line must be provided.</p> <p>c) Ground connection must be made according to the local regulations to avoid any electrical shock.</p> <p>d) Machine should be operable in standard shop air environment.</p> <p>e) All the hose/pipes and wires must be supplied by the seller.</p>
17	Software	The Software that can be used for programming the quoted machine needs to be supplied by the bidder.
18	Documentation	Complete set of machine documentation must be provided in one printed copy as well as in CD-ROM.
19	Working conditions	The machine's performance and its accessories should be suitable for an ambient temperature of 15- 30°C.
20	Warranty and Maintenance	<p>a) Minimum 1 year on-site warranty for all the components from the date of installation against all the design, material or manufacturing defects.</p> <p>b) The vendor shall install and configure all required hardware and open source software suites. The vendor should ensure that the hardware and software components are compatible with each other, and provide necessary cables/wires and any other accessories for connecting the supplied components. The bidder must install the complete system interconnecting all the components.</p> <p>c) Operational and maintenance ease should be taken into account.</p>
21	Ergonomics and safety	<p>a) Accessibility to the worktable in the machine.</p> <p>b) Emergency stop switch should be there to avert any harm to the machine or work in progress.</p> <p>c) Working area of the machine should be fully covered to avoid any harm to the operator from slurry splash or flying debris.</p> <p>d) The machine should have front/ side covered windows for the adequate visibility of the machining operation.</p> <p>e) The machine should be equipped with all the safety features necessary to protect the machine, control and the operator while in operation from possible damage/ injury.</p>

		In case a hazardous section opens during machine operation, the machine must make an emergency stop and issue an error.
22	Supplier capability	<p>a) Bidder should provide the list of installations and commissioning of a similar machine in a related industry/ institution (<u>at least three systems</u>) in India where it is being used successfully with customer feedback.</p> <p>b) The bidder must provide the <u>proof of capability of producing the silicon wafer of thickness of less than 50 microns within the surface roughness tolerance less than 200 nanometres.</u></p> <p>c) Bidders should be the direct manufacturer with subsidiary office in India or exclusive agent (certificate of exclusive agent for minimum of 5 years should be enclosed).</p> <p>d) Bidder should have a solid service support and provide service in India; all the machine parts should preferably be serviceable in India.</p>
23	Installation and commissioning	<p>a) Detailed installation layout drawing to be supplied along with the quotation.</p> <p>b) Requirements like air conditioning, dust free atmosphere and flooring to be specified.</p> <p>c) The installation and commissioning will be done by supplier's Engineers at IIT site within the stipulated time from the receipt of the machine at IIT site.</p>
24	Training	<p>a) During the period of installation and commissioning, the supplier should train the personnel required for operation and maintenance of the machine. The personnel should be trained to operate and maintain the machine independently.</p> <p>b) Training shall be imparted to the personnel who will be deputed for pre-dispatch inspection on operation, maintenance, fault finding/remedies, programming etc.</p> <p>c) During pre-dispatch inspection, training shall be imparted to at least 2 (two) persons.</p> <p>d) Firm shall impart on-site training to the staff in following disciplines i.e. maintenance of the mechanical, hydraulic, electrical and electronic parts/ functions of the machine including the assembly, fitting of various components and trouble shooting.</p> <p>The maintenance training shall be exhaustive in content and cover all the practical difficulties likely to be encountered.</p>
25	Compliance statement	Compliance statement needs to be provided by the vendors clearly specifying COMPLY/DO NOT COMPLY for all the items with the remarks. Bidder to provide, in the submitted tender bid, relevant supporting technical literature for EVERY item that they claim to comply with.

(B) Optional Items to be quoted:

51	Controller	All the feed drives should be directly driven by servo motors controlled by advanced controllers wherever necessary.
52	Wafer Mounter and Curing setup	a) Wafer Mounting setup for mounting the wafer upto size of 8” on the tape frame. b) All the necessary items required for mounting the wafer must be supplied. c) Curing setup for debonding the machined wafer from the tape frame/ carrier wafer should be supplied.
53	Chilling unit	The chilling unit for controlled temperature DI water supply, for spindle cooling and during the grinding operation, must be provided by the seller.
54	Vacuum suction machine	The vacuum machine to throw the collected dust from the debris collection chamber to exhaust pipe.
55	Lubrications	Lubricant for the smooth running of machine need to be provided by the supplier.



CENTRE FOR INDUSTRIAL CONSULTANCY & SPONSORED RESEARCH (IC&SR)
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI 600 036



B NAGARAJAN
JOINT REGISTRAR (IC & SR)

Project Accounts
July 22, 2016

TO WHOMSOEVER IT MAY CONCERN

In connection with project, **US currency may be transferred to CANARA BANK, IIT - MADRAS Branch** with the following details.

FOR TRANSFER OF CURRENCY US DOLLAR

Please Credit in USD

(THROUGH)

JP MORGAN CHASE, NEW YORK
SWIFT CODE: CHASUS33

For Credit to

USD ACCOUNT No: 001-1395969, of CANARA BANK INTERNATIONAL DIVISION
MUMBAI

For Further Credit to

ACCOUNT NO: **2722101001741** of IIT Chennai – Swift Code: **CNRBINBBIIT**
OF THE REGISTRAR, IIT, MADRAS


JOINT REGISTRAR (IC & SR) i/c

संयुक्त कुलसचिव (आई.सी. एवं एस.आर.)
JOINT REGISTRAR (IC & SR)

आई.आई.टी. मद्रास

This is to certify that the particulars furnished are correct.

For Canara Bank

Senior Manager
Canara Bank - IIT Madras branch



एस. अरवींदन
S.ARAVINDAN
सीनियर प्रबंधक Senior Manager
प.अ.सं. S.P.No.31649