

INVITATION FOR TENDER FOR SUPPLY OF EQUIPMENT

Sealed tender offers are invited in **two separate sealed covers** (*Technical and Commercial offers*) from eligible manufacturers/suppliers or their direct Indian agents for the supply of the following equipment. (*Details are given in Annexure-1*).

Hybrid Additive and Subtractive Manufacturing-based Metal 3D Printing Machine using Laser-based Direct Energy Deposition (DED) Technology

- The machine should contain full 5-Axis Motion CNC machining capability along with full 5-Axis Motion DED-based Laser Additive manufacturing capability.
- The machine should be capable of building large 3D-parts in metal using metal powders in controlled atmosphere and should be integrated with CNC machining capability.
- The machine should be capable of making metal parts with complex external and internal features layer-by-layer, metal parts with multiple layers of different metals, repairing of worn out metal parts etc.

Please send offers, **ALONG WITH DESCRIPTIVE CATALOGUE/ BROCHURE**. The validity of the bid should be at least five months (150 days) or more from the date of the opening of this tender. Please ensure that your quotation reaches not later than **22.10.2018 (Monday) by 15:00 Hrs. (IST)** at the following address.

**Professor-in-Charge,
DHI Centre of Excellence on Advanced Manufacturing Technology,
(Inside Steel Technology Centre),
Indian Institute of Technology Kharagpur, 721 302,
West Bengal, India**

Earnest money of **INR 14,00,000/- (INR Fourteen Lakh only)** is to be deposited in the form of Account Payee Demand Draft in favour of IIT Kharagpur, payable at Kharagpur, India. Any bid which is not accompanied with an EMD shall be summarily rejected. Earnest money deposited will be forfeited if the tenderer withdraws or amends its tender or impairs or derogates from the tender in any respect within the period of validity of its tender. No interest will be paid on the earnest money of the unsuccessful bidders.

Tender Reference	IIT/SRIC/CoE_AMT/DHI/2018/EQ31, Dated: 01.10.2018
Tender Fee	INR 15,000/- (<i>Account payee Demand Draft in favour of IIT Kharagpur, payable at Kharagpur, India</i>); Non-refundable
Last Date and Time for submitting the tender document	22.10.2018 (Monday) by 15:00 Hrs. (IST)
Time and Date of Opening of Technical Bids	22.10.2018 (Monday) by 16:45 Hrs. (IST)
Place of Opening Tender	SRIC Conference Room, Indian Institute of Technology Kharagpur, Kharagpur 721 302, West Bengal, India

Address of Communication	Office of Professor-in-Charge, DHI Centre of Excellence on Advanced Manufacturing Technology, (Inside Steel Technology Centre), Indian Institute of Technology Kharagpur, 721 302, West Bengal, India
Contact Telephone Numbers	+91- 3222 - 281576
E-mail	coeamt@gmail.com

Annexure-1

Hybrid Additive and Subtractive Manufacturing-based Metal 3D Printing Machine using Laser-based Direct Energy Deposition (DED) Technology

Detailed Technical Specifications (Hardware & Software Requirements)

Sl. No.	Description	Specifications
1	General features	<ul style="list-style-type: none"> • The machine should contain full 5-Axis Motion CNC machining capability along with full 5-Axis Motion DED-based Laser Additive manufacturing capability. • The machine should be capable of building mid to large 3D-parts in metal using metal powders in controlled atmosphere and should be integrated with CNC machining capability. • The machine should be capable of making metal parts with complex external and internal features layer-by-layer, metal parts with multiple layers of different metals, repairing of worn out metal parts etc.
2	Laser	<p>Ytterbium Fiber Laser (Should be from very reputed manufacturer with global presence in multi kilo-Watt power Yb-fiber laser market for more than 10 years)</p> <ul style="list-style-type: none"> • Laser power: 2 kW & upgradable to 3 kW • Wavelength 1070 nm+/-10 nm • Operating mode: CW/ Pulse • Power tunability: 10~100% or better • Out power instability: < 2.5% • Chiller for Water-cooling • Should be provided fiber length of 10 m or longer upto the deposition head.
3	Deposition head	<ul style="list-style-type: none"> • Standard Spot Size = 0.5-1.0 mm • Availability of Interchangeable Optics for 2 mm Spot Size (2 kW) • Deposition head could be water-cooled with a chiller of appropriate capacity • Should include separate water chiller for laser power 2 kW • 4 Tip Powder Nozzle Assembly (interchangeable mount) • Four integrated powder feeder • Each powder feeder mounted to side of machine enclosure • Each powder feeder unit programmable for custom blending of materials • Powder feed stability should be provided • Includes 10 m fiber cable.
4	Motion System	<p>3 axis motion system (XY Table, Z OH) with Siemens 840D controller (3+2 operation) Subtractive mode minimum XYZ travel (mm): 800 mm x 600 mm x 600 mm or higher Additive mode minimum XYZ Travel (mm): 550 mm x 600 mm x 600 mm or higher</p> <p>4th/5th Axis Motion:</p> <ul style="list-style-type: none"> • Table diameter 350 mm (minimum) • Maximum work piece (diameter x height): 350 mm x 400 mm • Table Payload 85 kg (minimum) • Tilt about X axis -40/+120 degree • Rotate about Z axis 360 degree Continuous • The machine should have high positional accuracy and repeatability; • Positional Accuracy (mm): ± 0.005 • Positional Repeatability (mm): ± 0.003

5	Controlled Atmosphere Glovebox System	<ul style="list-style-type: none"> • Inert enclosure gas-tight for Argon filled inert operation • Integrated Gas Purification System maintains Oxygen & H₂O Levels to < 40 ppm (for hybrid operation) • Includes laser safety package for CDRH Class 1 compliance • Sealed Door with glove ports and safety interlocks • Isolated Pass Thru Chamber (Antechamber) • Closed-loop atmospheric control • Enclosure can be run in Controlled or Open atmosphere configuration.
6	CNC machining facility	The subtractive machining facility will enable to machine the additively built part so as to improve the surface finish of the fabricated part. Built on a robust CNC platform, the system will have a 16 tool automatic tool changer (ATC) and a minimum 7600 RPM spindle for machining operations. The multi-axis machining strategy will be controlled by the software of the hybrid system.
7	Spares Kit and tool kit	Standard spare kit and tool kit should be provided with the supplied system
8	Workstation Control Software for Siemens 840D	Based on Siemens 840D Controller Interface
9	Chiller for deposition head	Should support minimum laser power of 2 kW
10	Software	<p>MasterCAM or equivalent Toolpath Generation Software with Additive Manufacturing Plug-in compatible to the quoted machine</p> <p>MasterCAM Mill 3D Professional or equivalent Software Single User Network License</p> <p>MasterCAM University minimum 12-week on-line training Single Student subscription (Mill Designs & Toolpaths) ADDITIVE PLUG-IN for MasterCAM Professional or equivalent (compatible to the quoted machine) Single User Network License</p> <p>2 days on site training for Additive Plug-in Professional (Training may be conducted during System Install)</p> <p>All software maintenance for five years included</p> <p>Software Package for Simultaneous 4 & 5 axis</p> <p>Simultaneous 5-axis Master Software (for Siemens 840D Controller or equivalent)</p> <p>Simultaneous 5-axis Post Processor</p> <p>Software Maintenance for five years.</p>
11	Melt Pool Sensor	Should be included (initial training during system install)
12	Touch Trigger Probe	Should be included (initial training during system install)
13	Materials Recipes	Large Volume, Small Volume & Thin Wall Recipes for In718, SS420, Ti64
14	Warranty	<p>Comprehensive warranty for two years from the date of installation</p> <p>Subsequent 3 years must be covered by Annual Full Service Agreement which includes</p> <ul style="list-style-type: none"> • System Online & Telephone Support • Limited Application Online & Telephone Support • Software Updates & System Field Change Orders • One Preventative Maintenance Visit by the manufacturer and four visits by Indian Agent, per annum.

15	Operator	Trained Operator should be provided for the system for five years (<i>Authorized Indian agent may quote for the same</i>)
16	Others	<ul style="list-style-type: none">• The offer should include Packaging, System Shipment including insurance from Factory to Airport.• Installation and set-up of the System includes Travel & Living Expenses and Basic Equipment Operation Training.

GENERAL TERMS & CONDITIONS

PLEASE SPECIFICALLY INDICATE THE FOLLOWING POINTS IN YOUR QUOTATIONS AND COMPLY THE TERMS AS MENTIONED HEREUNDER.

1. TENDER ARE INVITED COMPLYING THE REQUIREMENT FOR TENDER AS DETAILED IN THE TENDER SPECIFICATION TO BE SUBMITTED IN THE COMPANY'S / FIRM'S LETTERHEAD NEATLY PRINTED / TYPED DULY SIGNED BY AUTHORIZED PERSON WITH THE SEAL OF THE BIDDERS. ALL ENVELOPES CONTAINING THE TENDER SHOULD BE PROPERLY SEALED. SEPARATE ENVELOPES SHOULD BE USED FOR TECHNICAL AND PRICE BID AND INDICATION TO THEIR EFFECT MAY PLEASE BE SUPERSCRIBED ON THE ENVELOPE.

THE FOLLOWING DOCUMENTS ARE REQUIRED FROM THE INDIAN AGENTS OF FOREIGN FIRMS:

1.1 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.

1.2 COPY OF THE AGENCY AGREEMENT WITH THE FOREIGN PRINCIPAL INDICATING THE NATURE OF AFTER SALES SERVICES, PRECISE RELATIONSHIP BETWEEN THEM AND THEIR MUTUAL INTEREST IN THE BUSINESS.

2. TECHNICAL CATALOGUE/LEAFLET SHOULD BE ENCLOSED WITHOUT FAIL. COMPLIANCE STATEMENT WITH RESPECT TO THE TECHNICAL SPECIFICATIONS MENTIONED ABOVE SHOULD BE PROVIDED.
3. INDIAN AGENT SHOULD PLEASE CONFIRM WHETHER IT IS AUTHORIZED TO QUOTE ON BEHALF OF ITS PRINCIPALS AND IF SO, A COPY OF SUCH AUTHORISATION WITH ITS QUOTATION MAY PLEASE BE ENCLOSED.
4. **PRICE BIDS FOR FOREIGN FIRMS:** PRICES ARE TO BE QUOTED ON 'EX-WORKS' DULY PACKED OR ON "FCA/FOB" INTERNATIONAL PORT" BASIS AND ALSO INCLUDING AGENCY COMMISSION PAYABLE TO THE INDIAN AGENT, IF ANY SHOWING CLEARLY THE FOLLOWING BREAK UP:-
 - I) EX-WORKS PRICE
 - II) PACKING & FORWARDING
 - III) FREIGHT
 - IV) ANY OTHER RELEVANT EXPENSES.
 - V) TAXES PAYABLE BY THE INSTITUTE

INSURANCE WILL BE PAID BY IIT KHARAGPUR SEPARATELY AND SHOULD NOT FORM PART OF THE QUOTED PRICE.

PRICE BIDS FOR INDIAN FIRMS: PRICES ARE TO BE QUOTED ON F.O.R., IIT KHARAGPUR, ON DOOR DELIVERY BASIS CLEARLY SHOWING THE BREAK UP.

5. **PERIOD OF VALIDITY:** BIDS SHALL REMAIN VALID FOR ACCEPTANCE FOR A PERIOD OF 150 DAYS FROM THE DATE OF OPENING.
6. INDIAN AGENTS ADDRESS AND PERCENTAGE OF AGENCY COMMISSION INCLUDED IN ABOVE F.O.B./EX-WORKS PRICE. (THIS WILL BE PAID TO THE INDIAN AGENTS IN INDIAN RUPEES ONLY AND NOT IN FE). INDIAN AGENT SHOULD ENCLOSE COPY OF AGENCY AGREEMENT ENTERED

WITH ITS PRINCIPALS INDICATING THE NATURE OF AFTER SALES SERVICES OF INDIAN AGENTS, PRECISE RELATIONSHIP AND MUTUAL INTEREST IN THE BUSINESS.

7. **MEASUREMENTS/WEIGHT:** NETT/GROSS OF THE CONSIGNMENT. IN CASE OF AN ORDER, YOU SHALL USE AIR WORTHY PACKAGE (AS APPLICABLE) DULY CERTIFIED WITH DOCUMENTS – COMPLY TO – SANITARY CERTIFICATE (AS PER QUARANTINE ORDER 2003).
8. **SCOPE OF SUPPLY:** SHOULD INCLUDE FREE INSTALLATION AND COMMISSIONING.
9. **PAYMENT TERMS FOR FOREIGN FIRMS**

THE OFFER WILL BE MADE ON A SINGLE CURRENCY AND ONLY ONE PO WILL BE ISSUED FOR THE ENTIRE SCOPE OF THE SUPPLY.

- A) 90% PAYMENT THROUGH SIGHTDRAFT/FOREIGN DEMAND DRAFT/LC (EXCEPTIONAL CASES)/SWIFT TELE-TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER AND CONDITION AND 10% AFTER SUCCESSFUL INSTALLATION & COMMISSIONING.
- B) BANK CHARGES ON LC/SD (WITHIN INDIA APPLICANT ACCOUNT AND OUTSIDE INDIA TO BENEFICIARY ACCOUNT).

PAYMENT TERMS FOR INDIAN FIRMS

A) 100% PAYMENT THROUGH CROSSED ACCOUNT PAYEE CHEQUE / ELECTRONIC TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER & CONDITION AND SUCCESSFUL INSTALLATION & COMMISSIONING.

B) ENSURE MENTIONING

- i) BANK DETAILS OF THE BENEFICIARY, GST NO. AND PAN NUMBER
- ii) FULL NAME AND ADDRESS OF THE BENEFICIARY ON WHOM ORDER HAS TO BE PLACED

10. WHETHER ANY EXPORT LICENCE IS REQUIRED FROM YOUR GOVERNMENT, IF SO, PLEASE CONFIRM WITH DETAILS.
11. COUNTRY OF ORIGIN OF THE GOODS IS TO BE MENTIONED.
12. THE INSTITUTE SHALL PROVIDE THE CONCESSIONAL CUSTOMS DUTY AND EXCISE DUTY EXEMPTION CERTIFICATE AS PER GOVT. NOTIFICATION NO. 51/96 CUSTOMS DATED: 23.07.1996 AND CENTRAL EXCISE DUTY EXCEMPTION IN TERMS OF GOVT. NOTOFICATION NO. 10/97 – CENTRAL EXCISE DATED: 01.03.1997 AS AMENDED FROM TIME TO TIME.
13. **LIQUIDATED DAMAGES:** THE STORES SHOULD BE DELIVERED / DISPATCHED TO DESTINATION AND READY FOR OPERATION NOT LATER THAN THE DELIVERY DATE SPECIFIED. IT THE SUPPLIER FAILS TO DELIVER ANY OR ALL THE STORES OR PERFORM THE SERVICE BY THE SPECIFIED DATE, LIQUIDATED DAMAGES AT 1% PER MONTH OR PART THEREOF IN RESPECT OF THE VALUE OF STORES WILL BE DEDUCTED FROM THE CONTRACT PRICE SUBJECT TO A MAXIMUM OF 5%. ALTERNATIVELY, THE ORDER WILL BE CANCELLED AND THE UNDELIVERED STORES PURCHASED FROM ELSEWHERE AT THE RISK AND EXPENSE OF SUPPLIER.
14. **PATENT RIGHTS:** THE SUPPLIER SHALL INDEMNIFY THE PURCHASER AGAINST ALL THIRD PARTY CLAIMS OF INFRINGEMENT OF PATENT, TRADEMARK OR INDUSTRIAL DESIGN RIGHTS ARISING FROM USE OF THE GOODS OR ANY PART THEREOF IN INDIA.

15. ONLY THOSE BIDDERS WHOSE BIDS HAVE BEEN TECHNICALLY FOUND ACCEPTABLE WILL ONLY BE INVITED FOR PARTICIPATION IN THE PRICE BID.
16. THOSE BIDDERS WHO DO NOT RECEIVE ANY COMMUNICATION FOR PARTICIPATION IN PRICE BID OPENING MEETING MAY PRESUME THAT THEIR BID HAS NOT BEEN ACCEPTED BY THE INSTITUTE.
17. CONDITIONAL OFFER WILL NOT BE ACCEPTED.
18. LATE TENDERS i.e. TENDER RECEIVED AFTER THE DUE DATE AND TIME OF SUBMISSION AS MENTIONED ABOVE SHALL NOT BE ACCEPTED.
19. BIDDERS TO ENCLOSE THE FOLLOWING DOCUMENTS: -

A) INCOME TAX RETURN (3 YRS) AND LATEST SALES TAX RETURN (GST No.), AND PAN NO.

B) BANKER'S SOLVENCY CERTIFICATE

C) SUMMARY OF AUDITED STATEMENT OF ACCOUNTS FOR THE LAST THREE YEARS TO BE ENCLOSED AND FINANCIAL HIGHLIGHTS AND THE KEY PERFORMANCE DURING THE LAST THREE QUARTERS TO BE ENCLOSED AS PER FORMAT: -

COMPANY'S KEY PERFORMANCE

DESCRIPTION	JAN. TO MARCH	APRIL TO JUNE	JULY TO SEPT.
GROSS REVENUE			
PROFIT BEFORE TAX			
PROFIT AFTER TAX			
RETURN ON INVESTED			
CAPITAL (ROIC)			

D) CUSTOMER SATISFACTION CERTIFICATE FROM ONE SUCH ORGANIZATION IS TO BE ATTACHED WITH THE TECHNICAL BID AND PRICE BID.

E) NAME AND ADDRESS OF MINIMUM THREE CLIENTS TO WHOM SUCH EQUIPMENT HAVE BEEN SUPPLIED SHOULD BE MENTIONED.

20. **WARRANTY/ GUARANTEE: THIS COMPREHENSIVE WARRANTY/ GUARANTEE SHALL REMAIN VALID FOR MINIMUM 24 MONTHS (SUBSEQUENT 3 YEARS MUST BE COVERED BY ANNUAL FULL SERVICE AGREEMENT) AFTER THE GOODS (OR ANY PORTION THEREOF AS THE CASE MAY BE) HAVE BEEN DELIVERED AND COMMISSIONED TO THE FINAL DESTINATION.**
21. THE INSTITUTE DOES NOT BIND ITSELF TO OFFER ANY EXPLANATION TO THOSE BIDDERS WHO'S TECHNICAL BID HAS NOT BEEN FOUND ACCEPTABLE BY THE EVALUATION COMMITTEE OF THE INSTITUTE.
22. ALL TENDERS (UNLESS OTHERWISE SPECIFIED) ARE TO BE SUBMITTED / HANDED OVER TO

**OFFICE OF PROFESSOR-IN-CHARGE,
DHI CENTRE OF EXCELLENCE ON ADVANCED MANUFACTURING TECHNOLOGY,
(INSIDE STEEL TECHNOLOGY CENTRE),
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR, 721 302, WEST BENGAL, INDIA**

AND ACKNOWLEDGEMENT TO BE OBTAINED.

IMPORTANT

1. IIT Kharagpur authority may accept or reject any or all the bids in part or in full without assigning any reason and does not bind itself to accept the lowest bid. The Institute at its discretion may change the quantity/ upgrade the criteria/ drop any item or part thereof at any time before placing the Purchase Order.
2. Promptly make arrangements for repair and/ or replacement of any damaged item (s) irrespective of settlement of claim.
3. In case of any dispute, the decision of the Institute authority shall be final and binding on the bidders.
4. For any query pertaining to this bid document correspondence may be addressed to *Professor-In-Charge*, at the address mentioned above.

LAST DATE FOR SUBMISSION OF SEALED BIDS: 22.10.2018 (Monday) by 15:00 Hrs. (IST)

- 1) Please Note that the Institute remains closed during Saturdays & Sundays and all specified government holidays.
- 2) Fax, e-mail Tender will not be accepted.
- 3) The General Terms and Conditions as stated above relate to supply of stores / equipment /assets etc. and for specific service, other terms and conditions of the Institute will apply.
