



INDIAN INSTITUTE OF TECHNOLOGY MADRAS
Chennai 600 036

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V. Sathyanarayanan
Senior Manager (Project Purchase)

Ref: MET/SRRB/035/2017
Date: 16.11.2017

Open Tender No: MET/SRRB/035/2017

Due Date: 07.12.2017, at 2.00 pm

Pre-Bid meeting: - Not Required

Technical Bid opening meeting on 08.12.2017 at 3.30 p.m.

Dear Sir/Madam,

On behalf of the Indian Institute of Technology Madras, offers are invited for the supply of

“High Velocity Oxy-Fuel Spraying Coating Equipment”

conforming to the specifications given in Annexure.

A 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 below-mentioned addresses 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.**

(iii) **Pre-Bid meeting:** - Not required.

(iv) **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 it will be examined by a technical committee which will decide the suitability of the bid as per our specifications and requirements. The bidders will be invited for opening of Technical bids. In respect of opening of financial bid, those bidders who are technically qualified only will be called for.

(v) **Prices:** - The price should be quoted in nett per unit (after breakup) and must include all packing and delivery charges to various Departments/Centres/Institutions. The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. However the percentage of tax & duties should be clearly indicated.

The price should be quoted without custom duty and excise duty, since I.I.T. Madras is exempt from payment of excise duty, and the custom duty will be paid at concessional rate against duty exemption certificate.

In case of import supply, the price should be quoted on EX-WORKS and CIP basis indicating the mode of shipment.

(vi) **Agency Commission:** - Agency commission, if any, will be paid to the Indian agents in Rupees on receipt of the equipment and after satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in Tender 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 about the percentage of payment and it should be included in the originally quoted basic price, if any.

(vii) **Terms of Delivery:** - The item should be supplied to the Departments Metallurgical and Materials Engineering as per 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.

(viii) **Technical Bid Opening:** The technical bid will be opened on 08.12.2017 at 3.30 p.m at the Conference room, Department of Metallurgical and Materials Engineering, IIT Madras and the financial bids of those tenders who are technically qualified will be opened at a later date under intimation to them.

(ix) IIT Madras reserves the full right to accept / reject any tender at stage without assigning any reason.

Yours sincerely,



V. Sathyanarayanan
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IC&SR Building, I.I.T. Madras,
Chennai – 600 036

वी. सत्यनारायणन
V. SATHYANARAYANAN
वरिष्ठ प्रबंधक (परियोजना क्रय)
SENIOR MANAGER (PROJECT PURCHASE)
आईआईटी मद्रास/I.I.T.MADRAS-600036

SCHEDULE

Important Conditions of the tender

1. The due date for the submission of the tender is **07.12.2017, 2.00 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 “**High Velocity Oxy-Fuel Spraying Coating Equipment**” should be written on the left side of the Outer bigger cover and sealed.

2. **EMD: - EMD should be at 2% (two percent) of the tender value quoted by the bidder.** The EMD should be included in the Financial bid which will not be opened for Technical evaluation. **Enclosing the EMD in the Technical bid will automatically disqualify the tenderer.** EMD should be in the form of Account Payee DD, FD Receipt from the commercial bank, Bank Guarantee from any nationalized bank of India in favour of “The Registrar, Indian Institute of Technology Madras” and payable at Chennai. The tender without EMD would be considered as UNRESPONSIVE and REJECTED. Photo/FAX copies of the Demand Draft/Banker’s pay orders will not be accepted. No interest will be paid for the EMD and the EMD (Bid Security) will be refunded to the successful bidder on receipt of Performance Security.
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 of India will be an acceptable.

Only after submission of Performance Security, Letter of credit will be established / payment will be released.

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. 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.
 - ✓ The enlistment of the Indian agent with Director General of Supplies & Disposals under the Compulsory Registration Scheme of Ministry of Finance.
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. Documentary proof for the claimed position and repetition accuracies must be obtained from the principals and submitted along with the relevant pages of the standards.
8. Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.
9. **Validity:** Validity of Quotation not less than 90 days from the due date of tender.
10. **Delivery Schedule:-** The tenderer should indicate clearly the time required for delivery of the item. 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.
11. **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.
12. **Payment:-** 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).
13. **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.

14. **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.
15. **Warranty/Guarantee:** - The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Any extended warranty offered for the same has to be mentioned separately. (for more details please refer our Technical Specifications).
16. **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.
17. **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.
18. **Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.**
19. **Disputes and Jurisdiction:** -
 - a. **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 one 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.
 - b. **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.
20. All Amendments, time extension, clarifications etc., will be uploaded on the website only <http://tenders.iitm.ac.in> and will not be published in newspapers/CPP portal. 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**

Specification

Specification for HVOF Spray System

Offer is requested for High Velocity Oxy-Fuel (Gas based) spray system for Indian Institute of Technology Madras in Chennai. This system would be used for carrying out various coatings on flat substrates and components for R&D activity. The Scope of supply must be as below:

1. PLC based fully automatic Process Controller with mass flow controller for H₂, O₂ & N₂
2. HVOF spray gun with water cooled air cap with robot mounting fixture.
3. Water Sensing Interface.
4. PLC based Closed Loop Disc Type Powder Feeder Unit.
5. Water Chiller.
6. Air Filter Unit.
7. Gas Manifold for H₂, and O₂.
8. Gas Leak Detection system for acoustic chamber.

Technical Specifications

Sl. No.	Item	Value
<i>HVOF spray gun for H₂ with water cooled air cap and robot mounting fixture</i>		
1	Maximum gas velocity	2000 m/s or more
2	Max. gun weight	5 kg
3	Total heat output	100 kW or more
4	Robot Mounting fixture	1 Nos.
5	Recommended set of Spares	1 Set.
<i>PLC based Closed Loop Disc Type Powder Feeder Unit</i>		
1	Powder feed rate	Up to 300 g/min
2	Powder feed accuracy	±2 g/min
3	Particle size handling capacity	Up to 200 µm
4	Powder hopper capacity	1.5 liter or higher
<i>Gas manifold system</i>		
1	No. of H ₂ cylinders	20
2	No. of O ₂ cylinders	20
3	Distance from cylinder storage to Acoustic Booth	50 m

Water Chiller		
1	Refrigeration capacity	10 TR

Equipment Characteristics (Compliance required)

Sl. No.	Requirement	YES/NO
<i>PLC based Fully Automatic Process Controller With Mass Flow Controller</i>		
1	Should be PLC based controller providing control, monitoring and operation of system parameters.	
2	Controller must have multi gas compatibility for use of other gases in future	
3	Controller must have remote start and stop for powder feed operation and could be interfaced with external handling devices like gun manipulator or work manipulator.	
4	Controller should have separate enclosures like Gas Enclosure, electrical enclosure and system status monitor separately for safe working of system. Exhaust fan should continuously ventilate the gas enclosure. Any electricals inside gas enclosure should have positive pressure conditions to prevent spray dust or process gases.	
5	Controller should have monitor for safe operating conditions and alarms should be indicated on large and easy to read message center.	
6	Sufficient interlocks should be in-place to prevent operation in the event of unsafe conditions.	
7	Terminal points should be provided to allow us to add up to four additional remote alarms and remote emergency stop.	
8	Controller should be capable of lighting the gun, adjust the flame to selected recipe values and automatically start the powder feed process.	
9	Controller must continuously monitor the pressures of fuel gas, oxygen and air supplies and should be capable to shut down the system if the pressure should change beyond safe operating limits as a function of PLC.	
10	During System start up, controller should verify purging of all gas lines and initiation of powder flow of powder feeder carrier gas as a safe function of PLC.	
11	Controller should also initiate and monitor the ignition sequence for HVOF spray gun, shut down the system should gun fail to ignite or interruption of flame. Upon successful ignition, controller should initiate the flow of gases in accordance with the coating parameters in	


	the selected recipe prior to startup.	
12	Controller should have capability of sequence powder feed by remote handling equipment.	
13	Safety should be very important as a design consideration of controllers.	
14	Controller should have water sensing interface. In the event of gun water flow is below safe limits, controller should initiate shut down sequence.	
15	Controllers should have reliable, large, easy to read Flow scales and pressure values for consistent and repeatable coating quality.	
<i>HVOF spray gun with water cooled air cap and Robot Mounting Fixture</i>		
1	HVOF spray gun should be able to be used with Hydrogen gas.	
2	It should have Water Cooled front section enabling to produce higher particle velocities.	
3	HVOF Gun nozzle should be able to propel gas in supersonic speed.	
4	Powder injection should be axial thru powder injector.	
5	Gun should be able to be cooled with potable quality water	
6	Gun should be designed in such a way to eliminate possibility of back fire.	
7	It should be of modular design enabling easy replacement and maintenance.	
8	Must be designed for high pressure combustion	
9	Supplier should ensure sufficient length of hose for gas, water, powder for proper working of gun.	
10	Gun ignition should be thru ignition device and flame detector should be supplied along with gun. These devices should be connected to Controller for safety proposes.	
<i>PLC based Closed Loop Disc Type Powder Feeder Unit</i>		
1	Powder feeder should be capable of feeding full range of powders of HVOF grade powders over a wide range of feed rates.	
2	Powder feeder should be disc type working on volumetric feed principle to ensure good control over feed rate of powders.	
3	The power holding vessel (Canister) should have interchangeability with different size of Canister.	
4	Feeder should be provided with high pressure hopper assembly which	

	can with stand high pressure and also remain under constant pressure for safety. And hopper should have exhaust vent to protect against hopper over pressure conditions.	
5	All seals are to be used with O Rings to eliminate gas leaks to get accurate feed performance.	
6	Safety should be built in the design of feeder in such a way that high back pressure from HVOF gun should not reach hopper and prevent combustible gas from reaching hopper.	
7	The Control of the powder feeder should be integrated to main control panel such that the consolidated parameter of the spray can be printed or reported to text file	
<i>Water sensing interface unit</i>		
1	Water Interface unit should be able to interfaced with controller.	
2	Should the water flow falls below safe flow level, system should shut down shut down as safety measure.	
3	Should be able to be hooked to water chiller unit on one hand and should be able to be hooked to water cooled gun end on other hand.	
4	Should constantly monitor the amount of water flow for safe operation.	
<i>Water chiller unit</i>		
1	Water Chiller should be able to deliver water at suitable temperature and pressure to the gun for effective cooling	
2	Water chiller must have a 10 TR capacity	
3	Should be able to work at ambient to 45 °C temperature	
4	Water flow must be sufficient for cooling requirements	
5	Cooling capacity of the chiller must be sufficient for continuous operation	
6	Should be a hermetically sealed compressor	
<i>Gas Manifold System</i>		
1	Manifold should be for 20 cylinders of Hydrogen and 20 cylinders of Oxygen	
2	All gas cylinders should be secured to wall with chain to avoid falling of cylinder.	
3	H ₂ , O ₂ and N ₂ cylinders should be separately lined. All lines should be of SS pipes to with stand working pressure of gases.	
4	Gas regulators and safety vents should be accommodated into design	

	and all safety measure are to be taken into consideration.	
5	Gas lines should be color coded and leak tested before handing over.	
Accessories		
1	Accessories like hoses for gas / water should be supplied along with supplied units.	
2	Air Regulator with filers should be supplied. Multi stage gas regulator for H ₂ , O ₂ and N ₂ should be supplied along with supplies.	
3	Installation and commissioning of equipment should be done by supplier and prove out of system should be done by spraying few samples / on small components.	
4	Gas Leak Detection for H ₂ should be installed as a part of packages as a safety measure.	
5	Spares package for offer separately for 1 year of workings as an option.	
6	Supplier has to integrate complete system with Robot and Acoustic Chamber.	

Qualification criterion:

1. Only Original Equipment Manufacturers of equipments are allowed to bid for the tender. In case the OEM is not participating in tender, then OEM authorization is required for bidding by any Indian Firms. Quotation is to be obtained from the principals and PO will be released in the name of the principals.
2. Bidders must have supplied such equipment to minimum of 5 reputed firms, Universities or Lab's in India or abroad.
3. Bidders must have experience of working in the field of Aviation and Gas Turbine industry regarding requirements of specifications, approval of powders, manufacturing of powders, experience of working with aerospace / aviation / gas turbine industry.
4. Bidders should be approved by international agencies for conducting calibration of equipment.
5. CE approval of equipments is added advantage.
6. OEM should have service engineers available in India for any service issues to be attended at site.


वी. सत्यनारायणन
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