



भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(मानव संसाधन विकास मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्व का एक संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of H.R.D., Govt. of India)

STORES & PURCHASE SECTION Phone:(0326) 2235678 || Email : purchase@iitism.ac.in || Website : www.iitism.ac.in

No.: Mech-INS-204-18-19

Date: 21.08.2018

NOTICE INVITING TENDER

Subject: Supply and installation of Mixed Convection Setup with all Instrumentation

Indian Institute of Technology (Indian School of Mines), Dhanbad invites quotations for the following to be supplied and delivered in Mech. Engg. Department.

S. No	Full Description of items/ store	Qty	Delivery
1	Supply & Installation of Mixed Convection Setup with all Instrumentation (Detailed Specification is given in Annexure – I)	1	At the Earliest

Tender Schedule

Particulars	Date & Time
Bid Security or Earnest money deposit	Rs. 8000.00
Last date and time for submission of tenders	12.09.2018 at 1:00 P.M.
Date and time of opening of tenders	12.09.2018 at 3.00 P.M.

1. You are requested to quote your lowest rates for the supply of above items in the attached format for Financial Bid (Annexure – II)
2. You may send your representative in the office of the undersigned at the scheduled date and time of opening of tender.
3. Tender should be submitted in sealed cover only superscribed with Enquiry No. and due date at the following address only:

The Assistant Registrar (P&S)
Indian Institute of Technology (Indian School of Mines),
Dhanbad – 826 004 Jharkhand



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Terms & Conditions

- 1) The rates should be quoted for each item separately.
- 2) Conditional offer will not be accepted.
- 3) IIT (ISM) does not issue any Form 'C' or 'D' towards sales tax concessional rate.
- 4) **Bid Security or Earnest money deposit (EMD)**: should be submitted in form of A/c payee demand draft drawn in favor of Registrar, IIT (ISM) Dhanbad and payable at any other bank/branch located in Dhanbad.
- 5) Successful bidder has to submit performance bank guarantee @ 10% of total order value of the purchase order.
- 6) **Educational discount**, if any, should be clearly mentioned.
- 7) You are requested to submit your quotation strictly as per the specifications mentioned in the NIT.
- 8) Your tender must be valid for **minimum 90 days** from the date of opening of tender.
- 9) Please mention warranty/ guarantee in your offer clearly. Material/ equipment to be supplied must have minimum warranty/guarantee of **12 months**.
- 10) *Each page in the bid document must be numbered properly* and duly signed & sealed by the bidder on every page of the bid.
- 11) **The items/ materials shall be required to be delivered at Mech. Engg. Department/ Section through Purchase & Store Section, IIT (ISM) Dhanbad** at the risk and cost of the tenderer.
- 12) Unloading and installation shall be the complete responsibility of the supplier.
- 13) IIT(ISM), Dhanbad is entitled for Excise Duty Exemption under Govt. of India notifications and is registered with DSIR, Govt. of India for this purpose. This may be taken into consideration while quoting minimum possible rate. Exemption Certificates can be issued in favour of manufacturers only, if it is mentioned in the bid. It will not be issued any Indian Agent/dealer or distributor at any circumstances. IIT(ISM) will provide only custom duty exemption certificate for availing concessional custom duty. IIT(ISM) will not pay any extra custom duty other than duty exemption certificate.
- 14) The stores are required to be delivered within 30 days. Late delivery may not be accepted.
- 15) The items offered should be of good quality confirming to BIS standards, wherever applicable.
- 16) **Advance or part payment is not admissible**. Payment shall normally be made within 4-6 weeks subject to receipt and acceptance & installation of the ordered materials/items and submission of bills, PBG, followed by its verification etc. (as per Purchase Order Terms).
- 17) In the event date on which the tender is opened for acceptance is declared to be a holiday, the tenders shall be deemed to remain open for acceptance till the next working day.
- 18) Please send your offer by Regd.Post/ Speed Post/ Courier along with Courier receipt. Tender/ quotation will be received during IIT (ISM) working hours only (i.e. Monday to Friday). *Late or delayed tenders shall be summarily rejected*.
- 19) No interim queries will be entertained.
- 20) IIT (ISM) reserves the right to accept and/or to reject any/ all tenders without assigning any reason.

Assistant Registrar (P&S)



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Annexure - I

Technical Specifications:

SPECIFICATION OF MIXED CONVECTION SET-UP WITH ALL INSTRUMENTS

INSTRUCTIONS TO FABRICATE THE SET-UP

Manufacturer has to fabricate a rectangular ventilated cavity (01) with single inlet port at the bottom of left face and single outlet port at top of right face of the cavity and its dimension is shown in the Fig.2. This cavity will be assembled with different accessories as shown in the Fig.1. The dimensions [150mm×15mm (L×H)] of inlet and outlet port are same.

The inlet port of cavity is connected to one end of a rectangular duct (02) having dimension [20mm×150mm×15mm (W×L×H)] and second end of rectangular duct is joined with a conical duct (03) having dimension shown in the Fig.5. This conical duct is attached to a settling chamber (04) of dimension [120mm×900mm×90mm (W×L×H)] whose one end is free to atmosphere. Settling chamber should contain a honeycomb structure and a couple of wire meshes so that it works as a flow straightener.

The outlet port of cavity is connected to one end of a rectangular duct (05) and second end of rectangular duct is joined with a conical duct (06) having dimension shown in the Fig.5. This conical duct is attached to one face of a suction chamber (07) and its second face has a suction pipe of blower.

Regarding fixing of heat source manufacturer is advised to keep the right face (exhaust face) flexible so that different types of heat source at different location can be placed easily in the cavity. Two types of heat source at different locations are shown in the Fig.6. Heat supplied by the each heater should vary from 5W to 20W. The emissivities of heat source and inside surface of cavity vary from 0.0 to 1.0. So there should be a provision to measure the emissivity of required surface.

K-type thermocouples of very fine diameter wire are embedded in holes drilled much closer to the well-polished surface of heat source and steel plate at various locations along the wall as shown in the Fig.7 and 8 respectively for measuring the respective wall temperature. Thermal epoxy is placed over each wire to hold the thermocouples bead in place and ensure good thermal contact. Thermocouple channels are logged on to a RTD temperature scanner indicator for monitoring the temperatures. The thermocouples are routed through the walls without disturbing the flow. The entire test section is thermally insulated from its ambient environment by a glass wool of 100mm thickness, to reduce the heat losses.

Several thermocouples are placed vertically on the heat source along the height at equal distance at 10mm from the top and bottom edge of heater. Some thermocouples are placed horizontally along the length at equal distance of 20mm at 25mm from the left and right edge of heater. Two thermocouples are located at the rear end in the central region of the heater at the same distance as mentioned earlier from one end of edges. Thermocouples are also located on the top, bottom and inlet side wall at equal distance of 20mm at the middle section horizontally and vertically as shown in the fig. 8. Pressure and velocity sensors are placed at the inlet and outlet section to analyze the pressure drop and to measure the velocity of inlet and outlet air across the test section respectively.



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All the dimensions of respective components are given in the Table.1 and specifications of respective instruments are given in the Table. 2. Block diagram of experimental set-up, shape and size of components, position of heat source and position of thermocouples are shown by the figure in Annexure.

Table. 1 **SPECIFICATION OF CAVITY** (All dimensions are in mm)

S.No	Components	Dimension	Material	Remarks
01	Ventilated cavity	Dimension shown in the Fig. 2. (Inside dimension) Covered with wooden panel	Flat steel sheet	0.2 to 0.8 mm thickness
02	Heat source	Flat mica strip heater (Thin foiled covered with aluminium foil)	Small size 1=150×0.4×25 Small size 2=150×0.4×50 large size=150×0.4×185 (L×t×H)	0.4mm=Thickness
		Silicon Rubber heater	size=150×10×185(L×t×H)	10mm=Thickness
03	Inlet port	150×15 (L×H) (Inside dimension)		
04	Outlet port	150×15 (L×H) (Inside dimension)		
05	Rectangular duct	20×150×15 (W×L×H) (Inside dimension)	Wood	
06	Conical duct	Smaller cross-section (150×15) (L×H) (Inside dimension) Larger cross-section (900×90) (L×H) (Inside dimension) Length=120mm(Inside dimension)	Plywood and aluminium sheet	
07	Teflon tape/Glass wool	5 mm/100mm thickness (For thermal insulation) Conductivity=0.025-0.034 W/mK		
08	Settling chamber	120×900×90(W×L×H) (Inside dimension)	Wood	
09	Suction chamber	120×900×90(W×L×H) (Inside dimension)	Wood	
10	Wooden panel	Same as metallic plate dimension		10mm=Thickness



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Table. 2

SPECIFICATION OF INSTRUMENTS

S.No	Instruments	Specification	Accuracy	Number of pieces
01	Thermocouple	K-type (Operating temperature 20°C To 400°C)	±1%	About 40
02	Blower	220V,35-600W,50HZ,AC	NA	01
03	Speed regulator	220V,80W,0.5-20A,50HZ Air velocity limit = 0.2 to 50 m/s	NA	01
04	Silicon Rubber heater	Standard Thickness: 5-10mm Operating Temperature=30°C-400°C Maximum Wattage Density: 60 watts/in ² Maximum Voltage: 600 volts	Wattage Tolerance: standard +5% - 10%	1(185mm Height)
05	Flat mica strip heater	Voltage: 24 to 440V Single-phase or Three-phases Maximum temperature 400°C, maximum load 4.2W / cm² (25W/inch²).(Thin foiled covered with aluminium foil)	wattage tolerance = +5% -10%	3(25mm) 3(50mm) 1(185mm Height)
06	DC Power supply	Battery-12volt,230Ah	NA	01
		Inverter-220V,output power 2.25KVA	NA	01
07	Multimeter	1999 Counts Backlight AC/DC Ammeter Voltmeter Meter	±1%	01
08	RTD temp. indicator	Multiple input channel(Above 40), 12-24V,DC, K-type thermocouple,	±10%. 50/60Hz	01
09	Pressure sensor	12-24Volt, 0-1.0 MPa (Working fluid air)	±0.07% FS RSS	02
10	Velocity sensor	Velocity = 0.12 to 50 m/s Temperature = 20°C to 400°C	±2% of reading or ±0.015 of m/s	02
11	Emissometer	AC adapter, 100-240V, 50-60 Hz, 12 volts DC, with US standard modular power cord.	Repeatability: ± 0.01 of emittance	01



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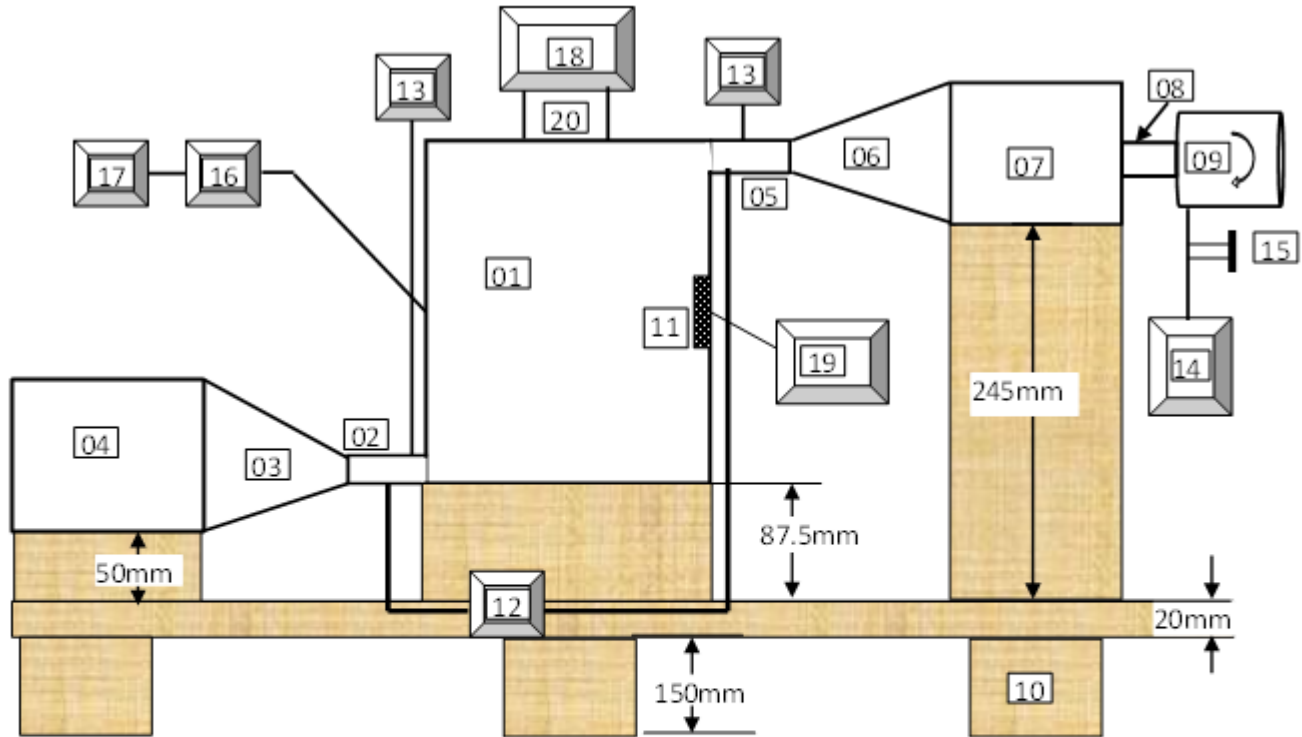
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ANNEXURE



01- Main ventilated cavity, 02- Rectangular duct at inlet, 03- Conical duct at inlet, 04- Settling chamber, 05- Rectangular duct at outlet, 06- Conical duct at outlet, 07- Suction chamber.
08- Suction pipe, 09- Blower, 10- Wooden stand, 11- Discrete heat source at the middle of face on exhaust side of cavity, 12- Pressure sensor, 13- Velocity sensor, 14- DC Power supply, 15- Speed regulator, 16- Multimeter, 17- AC Power supply, 18- RTD temperature indicator, 19- Emissometer, 20- Thermocouple

Fig. 1 Experimental set-up.



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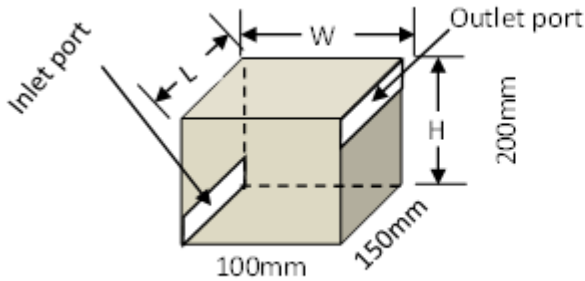


Fig. 2 Dimension of inside cavity

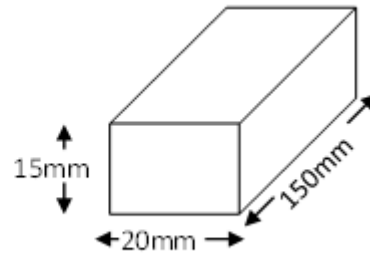


Fig. 3: - Dimension of rectangular duct at inlet and outlet

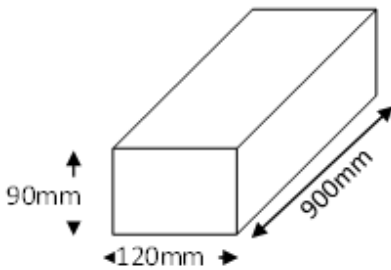


Fig. 4: - Dimension of settling and suction chamber

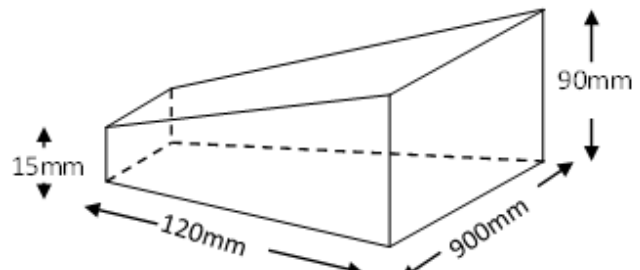


Fig.5: - Dimensions of conical duct

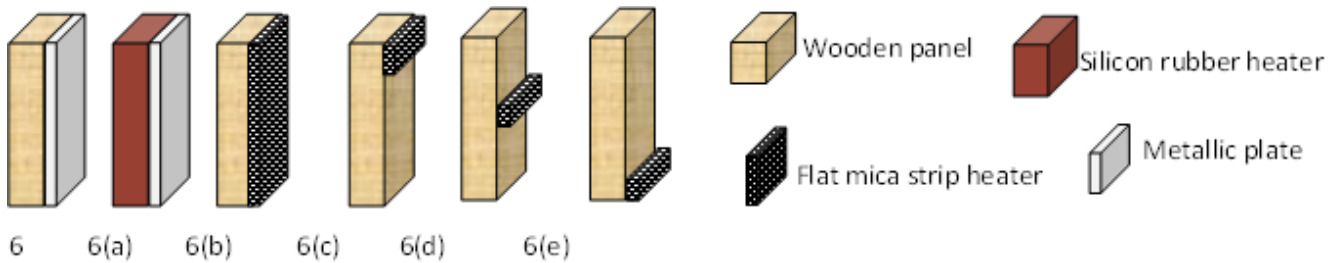


Fig.6 Position of different types of heater.

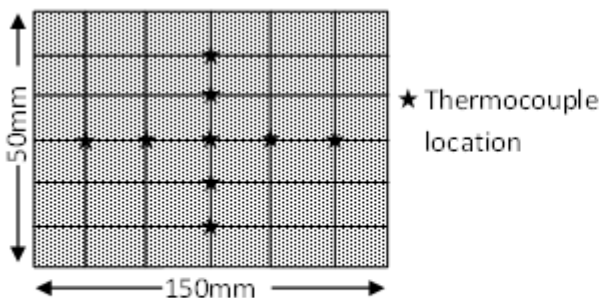


Fig.7: - Dimension of heat source with perfect location of thermocouples.

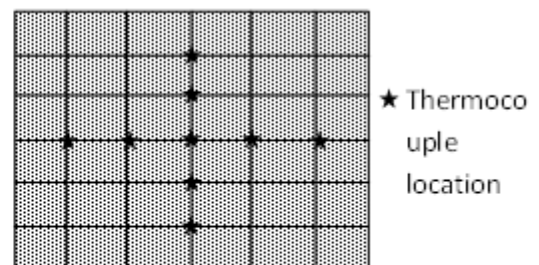


Fig.8: -Location of thermocouples on the top, bottom and inlet side wall.



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Annexure - II

Format for Financial Bid

NIT No.: Mech-INS-204-18-19

Date:

Bidders Ref: No.

Date:

GSTIN No.:

Subject: Supply & Installation of Mixed Convection Setup with all Instrumentation

Sl. No.	Full Description of Items with (HSN Code/SAC Code)	Qty.	Rate	Amount
			Packing & Forwarding (if any)	
			Total	
			GST	
			Freight (if any)	
			Installation (if any)	
	Amount should be in figure as well as word		Grand Total	

Note:

- 1) All the details must be provided as per prescribed format only
- 2) Prices quoted by the bidders should include GST, HSN Code, SAC Code, duties, livies, transportation cost and insurance costs etc. if any
- 3) All the rates must be quoted in Indian Rupees.