

**Mechanical Engineering Department
Notice Inviting Quotations**

Date: 16.10.2012

1. Sealed Quotations are invited from original equipment manufacturers or their authorized representatives for supply and commissioning of Mass Flow Controllers. These are to be used for measurement and control of flow rates of (i) Methane (ii) Air (iii) Methane-air mixture for the flame impingement heat transfer experiments. The technical specifications, and terms & conditions are given below. Interested parties are required to submit their offer under two part bid system with TECHNICAL and FINANCIAL bids in separate sealed envelopes. The two envelopes should be clearly marked as “Technical Bid” and “Financial Bid”. Both these sealed envelopes should be enclosed in a single sealed envelope, which should be clearly marked as “Quotations for Mass Flow Controllers”. The Quotations should be addressed to: Prof. Anjan Ray and submitted in the office of Department of Mechanical Engineering, IIT Delhi, Hauz Khas, New Delhi – 110016 **latest by 5:00 PM on 31st October 2012.**

2. Technical Specifications:

2.1	Accuracy	1% of full scale or higher accuracy
2.2	Repeatability	within 0.2 % of full scale
2.3	Operating Range	1 % to 100 % of full scale
2.4	Maximum Pressure	10 bar
2.5	Operating Temperature	0-50 °C
2.6	Output Signal	Volumetric Flow, Mass Flow, Pressure and Temperature
2.7	Controller response time	≤ 100 ms
2.8	Power Supply	24 V dc
2.9	Flow rate ranges	See s.no.3 below
2.10	Gas	(i) Methane (ii) Air (iii) Methane-air mixture. Multi-gas calibrations desirable, see s.no. 3 and 4 below
2.11	Fittings	push connect or compression adapter fittings

3. Flow rates and total number of MFC for each category

S.No.	Full scale flow rate	Gas	Number of MFC required (tentative)
3.1	10 SLPM	Methane-air mixture (mixture proportion given in s.no. 4 below)	9
3.2	1 SLPM	Methane	1
3.3	5 SLPM	Methane	1
3.4	10 SLPM	(i) Methane (ii) Air	1 +1
3.5	50 SLPM	Air	1

4. Volumetric Percentage of Air and Methane in methane-air mixture

S.No.	Air:Methane ratio	Percentage of Air*	Percentage of Methane
4.1	19.05	95.01%	4.99%
4.2	17.32	94.54%	5.46%
4.3	14.65	93.61%	6.39%
4.4	12.70	92.70%	7.30%
4.5	10.82	91.54%	8.46%
4.6	9.52	90.50%	9.50%
4.7	8.35	89.31%	10.69%
4.8	7.44	88.15%	11.85%
4.9	6.90	87.34%	12.66%
4.10	6.57	86.79%	13.21%

* Air is supplied from commercially available zero air cylinders and typically consists of 21 % Oxygen 79% Nitrogen (no humidity)

5. Information to be provided with the technical bid:

- 5.1 Following technical details must be provided:
 - (a) Mass flow range (minimum and maximum), Accuracy & turndown ratio for each controller.
 - (b) Standard Gases for which each MFC can be used. It is desirable that each of the MFC be calibrated for (i) Methane (ii) Air and (iii) 10 no. of methane-air mixtures as per s.no. 4 above. Please mention the cost, if any, for these additional calibrations for the offered instrument.
 - (c) Please mention if there is an option for multi-range calibration.
 - (d) Calibration accuracy of the MFC and calibration procedure adopted.
 - (e) Requirements for power supply and data transfer to a PC
 - (f) Details about the working of sensor.
 - (g) Details of testing and certification processes, including process for compliance to international standards, traceability to NIST or equivalent standards, periodic calibration requirements and procedure for the same.
- 5.2 Product brochure/catalog for the offered model(s).
- 5.3 Details of interface and other hardware (including PC/laptop, if any) that are an integral part of the system should be provided. Mention the cost of all the required accessories viz. filters, power supply, data cables, software (if, any), multi-channel drop box etc.
- 5.4 Compliance table indicating adherence to each item of the technical specification. If some specifications are not being met, deviations may be clearly stated. In the unlikely event that none of the vendors are able to meet the specifications, the committee reserves the right to waive or relax any of the requirements at the technical evaluation stage.
- 5.5 Assistance in installation and commissioning. Working of each MFC is to be successfully demonstrated at IIT Delhi.
- 5.6 List of customers to whom similar equipment/models have been supplied in the past five years. Please provide separate lists for supplies in India and in other countries. Copies of purchase order may also be attached.
- 5.7 List of certified service center(s) for the quoted model(s), in India, with supporting authorization document.

- 5.8 In case the items are proprietary products of the company, a proprietary certificate stating the same should be provided.
- 5.9 The delivery schedule should be mentioned.

5 Terms and Conditions:

- 6.1 Validity of the quotation should be at least 3 months from the date on which tenders are due.
- 6.2 Commissioning, demonstration and training sessions for IIT Delhi personnel at IIT Delhi for the instrument is mandatory and should be included in the offer.
- 6.3 Number of MFC mentioned in table 3 above is only indicative. Final decision about number of MFC will be made at the time of purchase. Vendors should mention the cost on per piece basis for each category mentioned in s.no. 3 above.
- 6.4 IIT Delhi is exempted from paying custom duty under notification No.51/96 (partially or fully) and necessary "Custom Duty Exemption Certificate" can be issued after providing following information. (a) Shipping details i.e. Master Airway Bill No. and House Airway No. (if exists) (b) Forwarder details i.e. Name, Contact No., etc. Custom Duty Exemption Certificate will be issued to the shipment in the name of the Institute and Bills of Entry should be submitted to IIT Delhi later on.
- 6.5 Either the Indian agent on behalf of the Principal/OEM or Principal/OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender. If an agent submits bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf of another Principal/OEM in the same tender for the same item/product.
- 6.6 If the Indian agent quotes for the abovementioned item on behalf of the foreign supplier, then the Indian agent should be enlisted with the Department of Expenditure, Ministry of Finance (Government of India). Copy of the supporting document has to be enclosed with the quotation. Further, in the letter it must be clearly stated from the principles that the bidder is an authorized agent.
- 6.7 IIT Delhi is exempted from paying Excise Duty and necessary Excise Duty Exemption Certificate will be provided for which following information is required. (a) Quotation with details of Basic Price, Rate & Amount on which ED is applicable.
- 6.8 Imported items should be quoted on FOB basis (Freight on Board) and FOB price be provided.
- 6.9 Three years comprehensive warranty be provided and AMC price beyond 3 years should be mentioned separately.
- 6.10 IITD reserves the right reserves the right to accept or reject any or all quotations without assigning any reason.
- 6.11 Payment Options:
- Letter of Credit: 90% payment against shipping documents & balance 10% after satisfactory installation.
 - Sight Draft: Payment against documents through bank.
 - Against Delivery: Payment by wire transfer after commissioning and demonstration of successful operation of the controllers and accessories.


Professor Anjan Ray
Department of Mechanical Engineering
IITD, Hauz Khas,
New Delhi 110016
E-mail: raya@mech.iitd.ac.in,
ray.anjan@gmail.com
Phone: +91 11 2659 1143