

TECHNICAL BID PROFORMA
Item Name: Computer Controlled gas Mixing System

1.0 Bidder Eligibility Criteria:

| I | Bidder Eligibility Criteria-I (Public Procurement – Preference to Make in India) | Class I / Class II | Local Content value | Reference, Page No. |
|-----|--|--------------------------------|-------------------------------|----------------------------|
| I | Only 'Class-I local suppliers' and 'Class-II local suppliers', as defined under DIPP, MoCI Order No. P-45021/2/2017-PP (BE II) dated 16 th September 2020 and other subsequent orders issued therein. | | | |
| 2.0 | Bidder Eligibility Criteria-II | Compliance (Yes/No) | Reference Page No. | Remarks, If any |
| 1 | The bidder/OEM should have supplied at least 5 similar items to IITs, NITs, IISERs, CSIR Labs or other Govt. organizations in the last 5 years, PO copies or installation certificates along with contact details of end user need to be submitted as the proof of supply. IIT Madras reserves its right to verify the claims submitted by the bidder and the feedback from the previous customers will be part of technical evaluation. | | | |

3.0 Technical Compliance:

2. Digital Mass Flow Controller Specification

| Sl.No | Gas | Flow rate (max) | Seal Type | Quantity (No.) | Complied or Not Complied | Ref.Page .No |
|-------|----------------|----------------------------|--------------------------|-------------------|--------------------------------|-----------------|
| 1 | CO | 6.872 kg/h / 100 SLPM | SS302/303/4 30, Viton | 1 | | |
| 2 | O ₂ | 7.853 kg/h / 100 SLPM | SS302/303/4 30, Viton | 1 | | |
| 3 | H ₂ | 4.941 kg/h / 1000 SLPM | SS302/303/4 30, Viton | 1 | | |
| 4 | O ₂ | 78.526 kg/h / 1000 SLPM | SS302/303/4 30, Viton | 1 | | |

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|---|-----|--------------------------|-----------------------|---|--|--|
| 5 | Air | 71.041 kg/h / 1000 SLPM | SS302/303/4 30, Viton | 1 | | |
| 6 | Air | 142.082 kg/h / 2000 SLPM | SS302/303/4 30, Viton | 1 | | |
| 7 | Air | 284.164 kg/h / 4000 SLPM | SS302/303/4 30, Viton | 1 | | |
| 8 | N2 | 0.075 kg/h / 1000 SCCM | SS302/303/4 30, Viton | 1 | | |

Detailed conditions:

| S.no | Specification | <u>Complied or Not Complied</u> | <u>Ref.Page.NO</u> |
|------|--|---------------------------------|--------------------|
| 1. | All the Mass Flow controllers should be of multi-gas selectable type . The Non-Corrosive Mass flow controllers should be preferable calibrated gases include for H ₂ , LPG, CO, N ₂ , O ₂ , Ar, Air, CH ₄ , CO ₂ , C ₂ H ₂ , and other hydrocarbons. | | |
| 2. | Controllers should have individual inbuilt LED /LCD / digital display with flow control switch and stand-alone power supply adopter to plug into power socket and use. | | |
| 3. | MFC should have the option for Personalized gas mixing compositions for accurate mixed gas measurement and switch between selected gases on the fly without any need for recalibration of the mass flow controller. | | |
| 4. | Software: A PC based software program that should interface with Appropriate cables provided for communication. The graphical user interface (GUI) should provide automatic configuration, session saving for easy Configuration and experiment setup reloads, data capturing and logging (including a graphing tool),simple and advanced script building for automating meter sequences, software alarms and support for multiple devices | | |
| 5. | Operating Pressure: variable depending on conditions and line pressures, min 14PSIA, Max 160 PSIA | | |
| 6. | Downstream pressure: 0.25 kg/cm ² (G) and vacuum | | |
| 7. | Proof Pressure: 175 psig | | |

| | | | |
|-----|---|--|--|
| 8. | Temperature range of operation: -10 °C to 60 °C | | |
| 9. | Wetted and Seal Material: Recommended Body material and seals suitable for the gas (preferably SS302 and Viton | | |
| 10. | Accuracy: $\pm 1\%$ or (0.8% of Reading $\pm 0.2\%$ of Full Scale) | | |
| 11. | Repeatability: $\pm (0.1\%$ of Reading + 0.02% of Full Scale) | | |
| 12. | Pressure sensitivity: 0.01% of full scale / PSI | | |
| 13. | It should have rigid metallic construction | | |
| 14. | The output of the controller should be 0–5v or 4 - 20 mA signals | | |
| 15. | The controller should be provided with circuit protection | | |
| 16. | It should be operated in the power supply of 230 V AC, 50 Hz | | |
| 17. | The controller should have the connection of compression gas fittings | | |
| 18. | Setting Flow Ramp up programming cycle should be possible by interfacing through the in build keypad with the display on the MFC | | |
| 19. | Manufacturer should have their own Re-Calibration and Service Centre in India. | | |
| 20. | Warm-up Time: Time < 1 Second | | |
| 21. | Typical Response Time <100 ms (Adjustable) | | |
| 22. | Operating Range : 0.01% to 100% Full Scale | | |
| 23. | Electrical Connection Options: DB9 Pin | | |
| 24. | All connecting cables/chords/interfaces ports and necessary power supply (110V to 230V converter) should be supplied along with the instrument | | |
| 25. | Detailed service manual and operating manual with circuit diagram should be provided along with the instrument | | |
| 26. | Necessary accessories such as Power Supply, Communication cable, software should be provided for trouble free operation of the instrument. | | |

| Gas Mixing Software: | | | |
|-----------------------------------|--|--|--|
| 1. | A graphical user interface Software should be connected either via RS232 or USB with the compatible Computer. | | |
| 2. | Combine 2 gases automatically | | |
| 3. | Instantaneous provision of required gas mixture with mouse click | | |
| 4. | Intuitive command structure | | |
| 5. | Automated flow implementation based on concentration and pressure | | |
| 6. | Error message prevent selection out of range | | |
| 7. | Store and retrieve setting | | |
| 8. | An affordable Software program that allows users to easily configure up to six mass flow controllers within a gas mixing station. Using an easy to understand graphical user interface (GUI), makes mixing gases very easy. offers a set up wizard for easy setup, the ability to save individual mixtures for easy loading, data logging to review mixture accuracy and performance and easy-to-use sliders to quickly adjust the total mixture percentage or the percentage of a single controller or multiple controllers. to help the test cycles run smoother and shorten engineering time! With easy configuration and experiment setup. | | |
| 9. | Session Saving: Save and reload your configuration data with confidence. | | |
| Delivery and Installation: | | | |
| 1 | The instrument should be safely deliver to IITM and the installation should be provided with the Mass flow controllers, Power supply, Communication cables, Hardware device to power and control up to nine Mass Flow Controller in a single power source and Communicate with all devices digitally via a single USB or serial cable to the Computer controlled Gas Mixing Software and 1 Year warranty from the date of installation of the system. | | |

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