

**(Technical Specification)**  
**Emission Bench for Testing SI and CI Engines under**  
**steady and transient conditions**

**Essential Requirements to be met by the bidders for qualification**

The vendor must have supplied and commissioned at least 10 such Emission measurement systems system with in India and at least 20 such systems worldwide with **identical or better specifications that include hardware, software and interfaces provided.** These supplies should have been in reputed research and development laboratories of government funded institutions or research and development divisions of leading automobile industries during the past 3 years. The vendor should provide the details of such organizations where such systems have been installed and are operating satisfactorily for at least 1 year. The details must include name and address of the organization along with the brief specifications of the supplied Emission Bench.

- **The vendor should be the manufacturer / local subsidiary of the manufacturer (not the agent of the manufacturer) of the hardware, software and interfaces that are to be supplied.** The vendor should have their Service Centre in India and trained personnel for after-sales service. Vendor has to submit the complete details of service set up.
- The two bid system is to be followed (technical bid and a commercial bid). The technical and commercial bids should be in separate sealed envelopes. **The commercial bid should also include the charges for comprehensive AMC for a period of 3 years after the warranty period along with the required consumables if any for this period.**
- Vendor should provide the list of utilities along with their capacity required to satisfactorily run the test facility along with the technical offer. The required civil work/ modifications will be carried out by IITM. Vendor should provide the drawings, data and manuals as per actual installation of the equipment within a month from the date of placement of the order.
- The emission bench must be capable of being interfaced with standard engine test and measuring systems used in the automotive industries. All the necessary hardware interfaces needed must be provided.
- The emission system must be capable of measuring raw emissions as per ETC (Transient) and NEDC engine test cycles. Evidence must be provided in this regard.

## Main Specifications

<b>Component / Supplier</b>	<b>Range</b>	<b>Principle of operation</b>	<b>Accuracy/ Repeatability</b>	<b>Linearity</b>	<b>Response time (T90)</b>
THC	0-25000ppmC in different ranges	Heated FID	Zero: Within +/-0.5% full scale, Span: Within +/-0.5% of reading	Within +/- 1.0% full scale or +/- 2.0% of reading whichever is lower	Less than 3.0s
CO	0-10% vol	NDIR	Zero: Within +/-0.5% full scale, Span: Within +/-0.5% of reading	Within +/- 1.0% full scale or +/- 2.0% of reading whichever is lower	Less than 1.5s
NO/NOx	0-10000 ppm in different ranges	Heated-Chemiluminescence	Zero: Within +/-0.5% full scale, Span: Within +/-0.5% of reading	Within +/- 1.0% full scale or +/- 2.0% of reading whichever is lower	Less than 1.5s
NO <sub>2</sub>	0-10000ppm in different ranges	Difference of "NOx – NO"	Zero: Within +/-0.5% full scale, Span: Within +/-0.5% of reading	Within +/- 1.0% full scale or +/- 2.0% of reading whichever is lower	Less than 1.5s
CO <sub>2</sub>	0-20% vol	NDIR	Zero: Within +/-0.5% full scale, Span: Within +/-0.5% of reading	Within +/- 1.0% full scale or +/- 2.0% of reading whichever is lower	Less than 1.5s
Methane	0-20000ppmC in different ranges	Heated FID with Non-methane cutter method	Zero: Within +/-0.5% full scale, Span: Within +/-0.5% of reading	Within +/- 1.0% full scale or +/- 2.0% of reading whichever is lower	Less than 3.0s
O <sub>2</sub>	0-ambient	Paramagnetic	Zero: Within +/-0.5% full scale, Span: Within +/-0.5% of reading	Within +/- 1.0% full scale or +/- 2.0% of reading whichever is lower	Less than 2.0s

**Other Specifications to be met:**

Two line provision for raw and dilute emission measurements.

The system should also have the capability to collect exhaust emissions as per standards during steady and transient test cycles in gasoline, diesel and gas engines.

The necessary sample handling, dilution units and sample bags and software to be provided.

**Time Schedule:**

The system should be supplied, installed and commissioned within 4 months after acceptance of Purchase Order.

**Warranty:**

The vendor should provide a warranty for at least 12 months from the date of commissioning of the setup.

**After Sales Support:**

The vendor should have well trained engineers for after sales support in India to service the installation at IIT Madras. Software upgrades inclusive of libraries relevant to the purchased hardware should provided as and when available free of cost.

**Technical clarification:**

For any technical clarifications, please contact Prof.A.Ramesh 044-22574676 or Email:aramesh@iitm.ac.in