



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY**  
**MATERIALS MANAGEMENT DIVISION**  
Powai, Mumbai 400076

**Specifications of Automotive Emission Gas analyser**

Required specifications for emission gas analyser for diesel and gasoline engines to operate on 230 V AC, 50 Hz, single phase

**Specifications**

**1. CO/CO<sub>2</sub> Analyzer (Nondispersive infrared-NDIR)**

CO Range: 0...0.5-12 vol %

CO<sub>2</sub> Range: 0...0.5-20 vol %

**2. O<sub>2</sub> Analyzer (Paramagnetic detector-PMD)**

O<sub>2</sub> Range: 0...1-25 vol %

**3. Heated Analyser Unit (19inch Rack mounted) to measure THC, NO<sub>x</sub>**

**a. Total hydrocarbon (THC) Analyzer (Flame ionisation detector-FID)**

THC Range: 0...30-60000 ppmC

**b. NO<sub>x</sub> Analyzer (Chemiluminescence detector-CLD)**

NO<sub>x</sub> Range: 0...10-10000 ppm

4. Type of applicable engines/fuels: diesel, gasoline, CNG, LPG, Ethanol, methanol, blended fuels, bio-CNG, biodiesel, biogas, hydrogen

5. Transient measurement capability: yes

6. Measurement rate: greater than 5 Hz (adjustable)

7. Interface protocol: AK-LAN

**8. Other specifications**

Sample gas flow rate	10 litre per minute
Sample inlet gas temperature	Less than 250 °C
Repeatability	±0.5 % of full scale (FS)
Accuracy	1 % of FS or 2 % of Reading whichever is smaller
Response time	1-2 s
Drift (8 hrs)	± 1 % of full scale per 8 h
Linearity	± 1 % of FS
Operating temperature	10 °C to 40 °C
Operating humidity	Maximum 80 %
Operating pressure	80 kPa to 102 kPa (absolute)
Noise in measurement	1 % of FS
Heated sample line	6 m

Sample line temp                      113 °C to 191 °C  
Warmup time                            Maximum 3 hours after power on

**It must include**

- 19" RACK
- Sample handling system (SHS)
- Solenoid Valve System (SVS) for calibration/operation gas
- Power Supply Unit (PSU)
- Power Cable
- DMC (Device Management Controller) with PC, LCD (Rack Mounted type)
- Analog output (Recorder Box: 0-10V)
- Data logging, task registration, screen capture, calculator etc.
- Drain pot
- Other necessary Tubes & piping e.g. Exhaust tube, Drain tube, Teflon tube and stainless steel pipes required for the installation and during the operation of the analyser
- Heated filter unit & lines (length = 6 m)
- The system must have the capability to manually perform:
  1. leak check
  2. calibration of each of the analysers in the system
  3. line response check
- It must be capable to accommodate EGR, methane (CH<sub>4</sub>) and NO<sub>2</sub> measurement system when required (as add-on).
- System to export the data online to another computer (should be provided and demonstrated by supplier).

Scope of supply of supply must include **1-year consumable parts** (Considering engine testing done for 8 hours a day for 5 days a week), and all the accessories needed for reliable and safe operation of the instrument on engine test bed.

4. **Installation and commissioning:** Installation and commissioning at IIT Bombay's site is in scope of the supplier/bidder (no cost will be borne by IIT Bombay). Bidder needs to provide adequate training to the nominated persons of IIT Bombay. IIT Bombay will not bear any training expenditure.

**5. General Terms and conditions**

- a. Vendors are supposed to quote suitable software/hardware for recording pollutant concentrations data in wide temperature range.

- b. Furnishing of wrong/ambiguous information in the compliance statement may lead to rejection of bid and further debarment of the bidder, if prima-facie it appears that the information in the compliance statement was given with a malafide/fraudulent intent.
- c. The supplier of the instrument must confirm in writing that the spares for the entire instrument will be available for a period of at least ten years after the model of equipment supplied has been phased out. For frequently required spares, there should be adequate inventory with the Indian agency.

#### **6. Warranty and Maintenance**

Bidders must give the comprehensive on-site warranty as required from the date of successful installation of Equipment for **one year** against any manufacturing defects and also give the warranty declaration that “everything to be supplied by us hereunder shall be free from all defects and faults in material, workmanship and shall be of the highest quality and material of the type ordered, shall be in full conformity with the specification and shall be complete enough to carry out the experiments, as specified in the tender document.

Any deviation in the material, and the specifications from the accepted terms may liable to be rejected and the bidders need to supply all the goods in the specified form to the satisfaction / specifications specified in the order / contract and demonstrate at their own cost. Bidders must quote for **3 years of AMC** after warranty period. Mode of support after warranty period also needs to be specified.

In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts, without any liability of cost. But it should be repaired within 72 working hours from the date and time of complaint lodged by the user. In case of any delay in repair without adequate justification, there will be penalty of rupees 5,000/- per day for the down time. Supplier should ensure to provide all spares required for making the instrument operational.

#### **7. Delivery:**

The Equipment should be delivered and installed within the period as specified in the purchase order and be ready for use within 24 weeks of the issue of purchase order unless otherwise prescribed.

#### **8. Eligibility Criteria :**

- 1. The bidder should have supplied at least three analysers with BS IV specifications or higher to national automotive testing and R&D infrastructure project (NATRIP) testing centres and reputed automotive original equipment manufacturers (OEMs) in the last five years. Out of the three at least two should have been supplied to NATRIP centres like ARAI (Automotive research association of India) or ICAT (International centre for automotive technology) or

GARC (Global automotive research centre) or NATRAX (National automotive test tracks) for automotive applications with BS IV capability or higher. Proof of supply has to be provided along with technical bid without any financial items being indicated.

2. No financial details should be specified in the technical bid. Violation will lead to disqualification.
3. Any other support systems that are needed for the functioning of the analyser but do not form a part of the analyser should be specified in the technical bid.