

Annexure - 2

ANNEXURE TO PI- 140661050

3.36. Technical Specification of Portable Dissolved Gas Analysis of Transformer Oil

3.36.1. Functional Requirement

The Portable Gas Chromatograph equipment to extract, detect, analyse and display the dissolved gases in transformer-oil as specified in IEEE C 57-104-1991 and IEC 60559-1999

3.36.2. Extraction of Gases

Gases shall be extracted from insulating oil either of the mercury free extraction method

- Shake test method as described in IEC-60567-2005-Annexure C
- Head space method
- Partial Degassing toepler pump method

3.36.3. Detection of Gases

The gases extracted as above shall be detected using either portable GC with TCD/FID/any other detector or using spectroscopic method. All the fault gases i.e. H₂, CH₄, C₂H₂, C₂H₄, C₂H₆, CO & CO₂ concentrations shall be individually measured and displayed. It is preferable that instrument also displays N₂ and O₂ content individually. The minimum detection limits of the instrument shall be strictly met the requirement of IEC-60567-2005-Page No.81-clause 9.2, table-5.

3.36.4. Performance Parameters

Gases	Minimum detection limit in ppm	Working range in ppm	Accuracy
Hydrogen-H ₂	5	0 - 5000	
Hydrocarbons- CH ₄ , C ₂ H ₂ , C ₂ H ₄ , C ₂ H ₆	1	0 - 10000	+/- 2 ppm or +/- 5% whichever is greater
Carbon Monoxide-CO	25	0 - 10000	
Carbon dioxide-CO ₂	25	0 - 50000	

3.36.5. Power Supply

It shall be operated with AC single phase, 50 Hz +/-5%, 230 V +/-10% supply. All power cable and necessary adaptors shall be provided by supplier.

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3.36.6. **Calibration**

- a) Instrument shall have facility to perform calibration check using GAS-IN-OIL standards as well as calibration gas mixtures. This GAS-IN-OIL standard shall be prepared in syringes in accordance with IEC-60567-2005-Page No.35-clause 6.2.
- b) The calibration shall be demonstrated by supplier at the time of installation/commissioning at our lab and AEGCL will provide only the insulating oil for testing.
- c) All necessary requirement like Glass syringes, 3 way cock and any other consumable required for calibration check shall include in the scope of supply.

3.36.7. **Instrument control and Data handling, Internal Memory**

- a) In case laptop is essential for operating the instrument, it shall be of latest specification along with licensed preloaded OS and software as well as software for interpreting DGA results accordance with IEEE C 57-104-1991 and IEC 60559-1999 along with laptop with carrying case included.
- b) In case instrument is having in built control for all the functions. Data acquisitions and data storage, it shall have a facility for communication with computer for downloading the data from instrument via USB port. Licensed copy of the software required to download data to computer shall be provided.
- c) Internal Memory can capable of store 15000 records, if inbuilt functions

3.36.8. **General Conditions**

All required items / instruments / spares / consumable / connecting cables/communicationcables/instruments/manuals/Certificates/trainingmaterials/original software/original licensed data//station operating software/education CD/DVDs that are essential to understand the basics and advanced gas chromatography and in parts/items that are essential to complete the supply, installation and commissioning the system required in the international standards ASTM-D-3612/2002 Method C / IEC-60567-05 shall be supplied to our laboratory in healthy condition and no extra cost.

3.36.9. **Operating Temperature, Relative humidity & Dimensions**

Temperature - 0-40 Deg. Centigrade

Relative humidity - 85% non-condensing

Dimensions -. Portable

3.36.10. **Receipt, Storage**

It shall be the responsibility of the supplier to ensure proper receipt and storage before commissioning the kit.

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Warranty

The entire test set up shall be covered on warranty for a period of 3 (three) years from the last date of complete commissioning and taking over the test set up. If the kit needs to be shifted to suppliers' works for repairs, supplier will have to bear the cost of, spares, software, and transportation etc. of kit for repair at test lab/works.

Application Note

An application note/principle document from original manufacturer compliance with standard test method shall be submitted along with the kit.

Service Support

The supplier shall furnish the detailed organization structure of the service team, who has acquired qualification and regular training records from manufacturer. Mode of attending service calls shall be given in details.

Training

The supplier shall arrange complete training by an application scientist who acquired technical & academic capacity of the principle company in the premises of our Laboratory for a period of two working days. The required reading materials/CDs shall be arranged by the supplier.

Spares and consumables

The manufacturer shall be responsible for supplying consumables and accessories for a period of 5 (five) years. The base price of above shall be quoted in the offer. ***Manufacturer shall have to submit an Indemnity Bond, declaring their liabilities to supply the consumables/spares at reasonable price depending upon base price quoted.***

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