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Date:16-09-2025

CORRIGENDUM-1

Tender Ref No	IITH/CE/PRITHA/2025/T019G
Tender ID	2025_IITH_874711_1
Name of Tender	1. Gas Chromatograph Mass Spectrometer (GCMS) 2. Gas Chromatograph (GC)
Reason of Corrigendum	Amendment to the specifications.

Description of Corrigendum: Amendment to the specification of 1. Gas Chromatograph Mass Spectrometer (GCMS) 2. Gas Chromatograph (GC)

Existing Specification:

A) Technical Specifications for Gas Chromatograph Mass Spectrometer (GCMS)

SPECIFICATIONS FOR HIGH-SPEED GC-MS

GC MAINFRAME:

- Gas Chromatograph with Advanced / Electronic /Programmable Flow control technology for Simultaneous Pressure, Temperature and Flow Programming
- Graphical user interphase with touch screen display of 7inch or better. Insightful Graphical User Interface (GUI) Interactive Communication Mode (ICM)
- Remote functionality with web monitoring and smart device control should be available.
- Large Column Oven with temperature range from Ambient +5°c to 450°c or better
- Temperature Accuracy: ±1 %
- Retention time repeatability: < 0.0008 min
- Peak area repeatability: < 1 % RSD
- Constant Linear velocity mode, constant pressure mode & constant column flow mode should be available
- Self-diagnostic function with GLP/GMP support
- Fast data transfer, acquisition speed of 500Hz (2ms) or more- should be able to "catch" very sharp peaks

- System should have the capability to accommodate Narrow Bore (0.1 mm i.d) to Wide bore capillary Columns (0.53mm i.d) columns
- System should have the capability to accommodate simultaneous at least 2 injection units & 4 detector units.

Column Oven:

- Column oven with inbuilt LED light for easy replacement of columns
- Fits at least two 100 m × 0.530 mm I.D. capillary columns
- Ambient rejection: < 0.01 °C per 1 °C
- Max run time: 1000 min
- Temperature range: (ambient +5 °C) to 450 °C
- Temperature Set point Resolution: 0.1 °C
- Temperature accuracy: set value (K) ± 1% (calibration at 0.01 °C)
- Temperature deviation: < 2 °C (on 200 mm dia. Circumference 30 mm from rear)
- Programmable temperature ramps: 20 ramps or or more
- Oven cool down time: 450 °C to 50 °C within 4 min or less

Split/ Splitless Injector:

- Injection mode: Split/Splitless; High pressure injection
- Split ratio: Up to 1000:1
- Pressure range: 0 to 1035 kPa
- Maximum operating temperature: 450 °C
- Supports capillary columns from 50 µm to 530 µm I.D. / Electronic septum purge comes built-in / Gas saver mode reduces gas consumption
- The system should be able to install 2 independent temperature-controlled injector units simultaneously.
- The system should be able to set total flow range: 0 to 1,200ml/min for He and H_2, and advanced/electronic flow control pressure range up to 1035 KPa or higher
- Efficient gas saver mode is desirable to reduce gas consumption during standby without affecting performance.

Auto Injector:

- Sample injection method: Liquid sample injection via micro syringe
- Number of samples: 15 vials or more
- Number of sample injections: minimum 1-99 injections per sample

Head Space Sampler:

- Sample Injection Method: Sulfinert Sample Loop 1mL.
- Leak check function for all vials
- Vial warming temperature: Room temperature +10 to 300˚C, in 1˚C units with accuracy of ±0.1˚C

- Transfer Line temperature: Room temperature +10 to 350˚C, (set in 1˚C units with accuracy of ±0.5˚C
- Electronically controlled Carrier Gas. Flow setpoints must be adjusted by increments of 0.01 mL/min or better
- Electronically controlled Vial Pressurized Gas Control
- Compatibility with different sizes of headspace vials of 10 mL, 20 mL etc. sizes (or any other suitable sizes) with unrestricted use of different vial sizes within a single sequence.

MS Detector with EI (Electron Ionization):

- Mass Filter: molybdenum hyperbolic rods and applied by a small AC voltage besides the normal DC (U) and AC (V) voltages to improve the mass resolution.
- The quadrupoles must have pre-rods as filters to minimize the influence of contamination and thus increase the sensitivity.
- The quadrupole mass filter must not require constant heating as required by monolithic quartz (non-metal) quadrupole.
- The Collision cell must be an "Ultra-Fast Collision Cell" for efficient ion acceleration and ensuring zero cross talk.
- The mass spectrometer must have Electron Ionization (EI), Positive Chemical Ionization (PCI) and Negative Chemical Ionization (NCI) modes supplied as standard.
- MS-MS capability must be available in Quadruple 2 [Q2] via Collision Induced Dissociation (CID). The gas used for fragmentation should be preferable Argon or Helium
- Special arrangements should be available to avoid contamination and keep the quadruple cleaner ensuring uninterrupted operation. Appropriate quadruple materials should be considered to meet these requirements.

- Mass Range : 10 to 1050 amu or more with unit mass resolution over the entire mass range
- Mass Marker Stability : ±0.1 amu / 24 hours or better
- Dwell Time : Less than 0.5 msec
- Scan Speed : 20,000 amu/sec (Q3 Scan)
- Interface Temperature : 50 ^{0}C to 350 ^{0}C
- Electron Energy : 10 – 200 eV
- Emission Current : 5 - 250µA
- Filament : Dual (Automatic Switching with shield placed between filament and Source box)
- Collision energy : Up to 60 eV
-
- Maximum SRM and MRM Speed: 800 transitions/Sec or better
- Linear dynamic range : 8 x 10^{6}
- Detector : Secondary Electron Multiplier with Overdrive Lens and conversion dynode detector

- Air-cooled Differential Turbo Molecular Pump of a minimum capacity of 250L/Sec and above.
- Foreline / Rotary Pumps with oil mist Filter 30ml/min for initial Vacuum build-up.
- EI scan sensitivity: Signal-to-noise (S/N) > 1500 at m/z 272 for 1pg OFN in EI scan.
- EI MRM sensitivity: Signal-to-noise (S/N) > 18000 for the transition from m/z 272 to m/z 222 for 100fg OFN in EI MRM.
- Vent free column changing facility should be available in system to above time loss and system can up within less than 90 min or less after column change for analysis or ready to inject.

7.Software for Control of GC as well as GCMS:

- 64-bit windows-based Software Should Provide Single Point Control of all GCMS Parameters, Injectors, detectors.
- Software should have Security, Audit trail, System check, Software integrity and system Suitability test should be included as standard functions.
- Flexible report Format i.e for Method, chromatogram, Mass Spectrum, Peak table, Quantitation result, calibration curve, Status Log, texts, graphics.
- It should provide automated tuning & File management functions with Library Search facility.
- There should be User friendly post run analysis facility with flagging.
- Complete Software control of vacuum system with Auto Start-up / Shut-down and vacuum protection against Power Failures.
- Latest licensed NIST and Wiley library
- Software should be 21 CFR Part 11 Compliant; a third-party certificate is mandatory.

8.Syringes & Columns:

- 2mL gas-tight syringes – 1 each
  - Suitable for analysis of permanent gases and light hydrocarbons up to C5 (N2, H2, O2, CO, CO2, C1-C5 hydrocarbons with all isomers) – 2 no
  - For analysis of liquid hydrocarbons - alcohols, aldehyde/ketone, organic acids, aromatics, fatty acids, diesel, gasoline and aviation fuel range hydrocarbons- 5 no

9.Installation Accessories:

- Branded Computer with Multi-functional Wi-Fi and network enable LaserJet Printer – 1 set
- 10 KVA Online UPS with isolation transformer - one Hour Battery backup for GCMS system – 1 No
- Gas cylinders filled with respective gases and double stage regulators: N2, He, and Ar one each
- Gas purification panel set for Helium, Argon with filled cylinders & SS regulators, should include Molecular sieve, Moisture & Oxygen traps, hydrocarbon traps with necessary tubing's, Nuts & Ferrules.

10.Consumeables / Spares:

- Graphite ferrules 0.5…..10/pkt – 2 no
- Graphite ferrules 0.8…….10/pkt – 2 no
- Capillary column ferrule set, 0.5mm (10pcs /pkt) – 2 no
- septum x 50 pcs – 2 no
- insert liner (split, splitless) x 5 pcs each
- Vespel ferrule x 10 pcs (0.25mm ID Column) – 2 no
- Vespel ferrule x 10 pcs (0.32mm ID Column) – 2 no
- 20mm Crimper – 1 no
- 20mm Decapper – 1 no
- Column nut x 10 pcs – 1 no
- insert O-ring x 10 pcs – 1 no
- 1 triple gas filter kit - 1/8" SS – 1 no
- Filter for split – 1 no
- EI Filament – 6 nos
- Scotch Brite for polishing the ion source, 1 pc – 1 no
- Gold packing, 1 pc – 1 no
- Aluminum packing, 100 pcs – 1 no
- Enough Source cleaning material
- Insulator bush, 1 pc – 1 no
- Vacuum OIL R- 4 Ltrs.
- Mass number calibration standards: for MS.
- Headspace auto sampler vials (20 mL) with caps: 200 no
- Vials for ALS (2mL): 1000 no
- Any other consumables, spares required for GC MS/MS systems should be included in enough quantities with a list for continuous operation for atleast three years. All these spares should be available for next 10 years.

Important Note(s):

- Warranty: A comprehensive warranty of minimum three year from the date of installation.
- List of users of the GC in any national level government research institutes of universities and furnish three performance certificates from these institutions/universities should be provided.

Terms and conditions for instruments

- The supplier must provide installation, commission, and multiple training sessions (After installation, after month for upgrade training, 6 months and after one year completion) for a group of technical staff/students from operating the instrument to complete structure determination/solution at site without any additional cost with supply of all the relevant manuals and documents in printed format.

- The supplier must demonstrate that they have appropriate set-up and capability to provide after-sales service effectively in India for prompt service support along with number of service engineers specially trained on the offered system. The supplier should ensure that service engineers will be available to attain the service call within 48 hrs of intimation to avoid longer downtime of the instrument.
- The supplier must provide detailed lists of Indian users for quoted models and contact details. At least THREE purchase orders with prices not older than 3 years from IITs/NITs/Central University/any other Govt organizations should be included with the technical bid. The performance certificate of the quoted GC system from Indian users (at least 3) should be included along with the technical bid.
- Necessary pre-installation advice should be sent immediately after the placement of the order.

B) Technical Specifications for Gas Chromatograph (GC)

SPECIFICATIONS FOR HIGH-SPEED GAS CHROMATOGRAPH WITH FID & TCD

GC MAINFRAME:

- Gas Chromatograph with Advanced / Electronic /Programmable Flow control technology for Simultaneous Pressure, Temperature and Flow Programming
- Graphical user interphase with touch screen display of 7 inch or better. Insightful Graphical User Interface (GUI) Interactive Communication Mode (ICM)
- Remote functionality with web monitoring and smart device control should be available.
- Large Column Oven with temperature range from Ambient +5^{o}C to 450^{o}C or better
- Temperature Accuracy: ±1 %
- Retention time repeatability: < 0.0008 min
- Peak area repeatability: < 1 % RSD
- Constant Linear velocity mode, constant pressure mode & constant column flow mode should be available
- Auto Ignition facility should be available
- Self-diagnostic function with GLP/GMP support
- Fast data transfer, acquisition speed of 500Hz (2ms) or more- should be able to "catch" very sharp peaks
- System should have the capability to accommodate Narrow Bore (0.1 mm i.d) to Wide bore capillary Columns (0.53mm i.d) columns
- The system should have the capability to accommodate simultaneous at least 2 injection units & 4 detector units
- 6 Port Valco valve with heating arrangement and sample loop: 500uL, 1mL, 2mL & 5mL.

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Column Oven:

- Column oven with inbuilt light illumination arrangement for easy replacement of columns
- Fits at least two 100 m × 0.530 mm I.D. capillary columns
- Ambient rejection: < 0.01 °C per 1 °C
- Temperature Set point Resolution: 0.1 °C or better
- Temperature accuracy: set value (K) ± 1% (calibration at 0.01 °C)
- Temperature deviation: < 2 °C (on 200 mm dia. Circumference 30 mm from rear)
- Programmable temperature ramps: at least 20 ramps
- Oven cool down time: 450 °C to 50 °C within 4 min or less

Split/ Splitless Injector – 2 nos:

- Injection mode: Split/Splitless; High pressure injection
- Split ratio: Up to 10000:1
- Pressure range: 0 to 1035 kPa
- Maximum operating temperature: 400 °C
- Supports capillary columns from 50 µm to 530 µm I.D. / Electronic septum purge comes built-in / Gas saver mode reduces gas consumption
- The system should be able to install 2 independent temperature-controlled injector units simultaneously.
- The system should be able to set a total flow range: 0 to 1,200ml/min for He and H_2, and advanced/electronic flow control pressure range up to 1035 KPa or higher
- Efficient gas saver mode is desirable to reduce gas consumption during standby without affecting performance.

Detectors:

1. **FID:**

- MDQ: <1.2 pg C/s (dodecane)
- Linear Dynamic Range: $1x10^{-7}$
- Acquisition Rate: 2ms (500Hz)
- Max. Operating Temperature: 450˚C
- Automatic flame out detection and re-ignition feature must be available

2. **TCD:**

- Sensitivity: > 20000 mV × mL/mg (decane)
- Dynamic range: 1×10^5
- Max acquisition rate: 2 ms (500 Hz)
- Max operating temperature: 400 °C
- Standard EPC for carrier gases.

Auto Injector:

- Sample injection method: Liquid sample injection via micro syringe
- Number of samples: 15 vials or more
- Number of sample injections: minimum 1-99 injections per sample

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Software for Control of GC:

- 64-bit windows-based Software Should Provide Single Point Control of all GC Parameters, Injectors, detectors.
- Software should have Security, Audit trail, System check, Software integrity and system Suitability test should be included as standard functions.
- Software should be 21 CFR Part 11 Compliant; a third-party certificate is mandatory.

Columns:

- Suitable for analysis of permanent gases and light hydrocarbons up to C5 (N2, H2, O2, CO, CO2, C1-C5 hydrocarbons with all isomers) – 2 no
- For analysis of liquid hydrocarbons - alcohols, aldehyde/ketone, organic acids, aromatics, fatty acids, diesel, gasoline and aviation fuel range hydrocarbons- 3 no or more

Installation Accessories:

- Branded Computer – 1 set
- Filled Hydrogen, Nitrogen, Zero Air, argon, helium Gas Cylinders: 1 each
- Double Stage Gas Regulators for all the above Cylinders
- Gas Purification Panel for GC should include Molecular sieve, Moisture & Oxygen traps, hydrocarbon traps with necessary tubing's, Nuts & Ferrules.
- 1mL, 5ml gas tight syringe – 5 nos each
- 2 mL vial with cap: 1000 no or more
- Septum: 100 no. or more
- Auto injector syringe (1, 5, 10 µL): 5 no each
- Column ferrule suitable for 0.25um, 0.32 um, and 0.53 um: 20 each or more
- Other necessary consumables, spares, tool kit etc. for at least for Five years of continuous operations with a list and quantity.

Important Note(s):

- Warranty: Comprehensive warranty of GC system with all accessories for minimum three years or more from the date of installation.
- List of users of the GC in any national level government research institutes of universities and furnish three performance certificates from these institutions/universities should be provided.

Terms and conditions for instruments

- The supplier must provide installation, commission, and minimum two training session (first training session during installation and another training session any time after six months from the date of installation) for a group of technical staff/students from operating the instrument to complete structure determination/solution at site without any additional cost with supply of all the relevant manuals and documents in printed format.

- The supplier must demonstrate that they have appropriate set-up and capability to provide after-sales service effectively in India for prompt service support along with number of service engineers specially trained on the offered system. The supplier should ensure that service engineers will be available to attain the service call within 48 hrs of intimation to avoid longer downtime of the instrument.
- The supplier must provide detailed lists of Indian users for quoted models and contact details. At least THREE purchase orders with price information not older than 3 years from IITs/NITs/Central University/any other Govt organizations should be included with the technical bid. The performance certificate of quoted GC system from Indian users (at least 3) should be included along with the technical bid.
- Necessary pre-installation advice should be sent immediately after the placement of the order.

C) Eligibility Criteria:

1) Must have been supplied in IITs/NITs/Central Universities/Centrally Funded Institutes or to any other reputed research Institute.

2) The bidder must provide CMC support for a minimum of 5 years.

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Amended Specification:

A) Amended Technical Specifications for Gas Chromatograph Mass Spectrometer (GCMS)

AMENDED SPECIFICATIONS FOR HIGH-SPEED GC-MS

GC Mainframe:

- Gas Chromatograph with advanced/electronic/programmable flow control technology for simultaneous pressure, temperature, and flow programming.
- Graphical user interface display of 7 inches or larger.
- Remote functionality with web monitoring and smart device control.
- Large column oven with temperature range from ambient +5 °C to 450 °C or higher.
- Temperature accuracy: ±1%.
- Retention time repeatability: < 0.0008 min.
- Peak area repeatability: < 1% RSD.
- Constant linear velocity, constant pressure, and constant column flow modes should be available.
- System should accommodate narrow-bore (0.1 mm I.D.) to wide-bore (0.53 mm I.D.) capillary columns.
- System should support at least 2 injection units and 4 detector units simultaneously.

Column Oven:

- Fits at least two 100 m × 0.530 mm I.D. capillary columns.
- Ambient rejection: < 0.01 °C per 1 °C.
- Temperature range: ambient +5 °C to 450 °C.
- Temperature set point resolution: 0.1 °C.
- Temperature accuracy: set value (K) ±1% (calibrated at 0.01 °C).
- Programmable temperature ramps: 20 or more.
- Oven cool-down time: 450 °C to 50 °C within 4 minutes or less.

Split/Splitless Injector:

- Injection mode: split/splitless; high-pressure injection.
- Split ratio: up to 1000:1.
- Supports capillary columns from 50 µm to 530 µm I.D.; electronic septum purge built-in; gas saver mode for reduced gas consumption.
- Capable of installing 2 independent temperature-controlled injector units simultaneously.
- Total flow range: 0–1,200 mL/min for He and H_2, with advanced/electronic flow control.
- Efficient gas saver mode should be available to reduce standby gas consumption without compromising performance.

Headspace Sampler:

- Sample injection method: Sulfinert sample loop, 1 mL.
- Leak check function for all vials.
- Vial heating temperature: room temperature +10 °C to 300 °C, adjustable in 1 °C increments, accuracy ±0.1 °C.
- Transfer line temperature: room temperature +10 °C to 300 °C, adjustable in 1 °C increments, accuracy ±0.5 °C.
- Electronically controlled carrier gas with flow set points adjustable in 0.01 mL/min increments or better.
- Electronically controlled vial pressurization.
- Compatible with multiple headspace vial sizes (10 mL, 20 mL, etc.), with unrestricted use of different vial sizes within a single sequence.

MS Detector with EI (Electron Ionization):

- Mass Filter: Hyperbolic or round-shaped rods with DC and AC voltages applied to improve mass resolution.
- Quadrupoles must minimize contamination effects through advanced source techniques to enhance sensitivity. Features such as heating capability in quadrupoles to reduce contamination, decrease downtime, and minimize maintenance, thereby improving instrument lifespan and sensitivity, are highly desirable.
- The collision cell must ensure efficient ion acceleration and zero cross-talk.
- The mass spectrometer must have Electron Ionization (EI).
- MS/MS capability must be available in Quadrupole 2 (Q2); nitrogen (N_2) should preferably be used as the fragmentation gas.
- Arrangements must be provided to avoid contamination and maintain a clean quadrupole, ensuring uninterrupted operation. Appropriate quadrupole materials should be used to meet these requirements.

Performance Specifications:

- Mass range: 10–1050 amu or higher, with unit mass resolution across the entire range.
- Mass marker stability: ±0.1 amu per 24 hours or better.
- Dwell time: < 0.5 msec.
- Scan speed: 20,000 amu/sec (Q3 scan).
- Interface temperature: 50 °C to 350 °C.
- Emission current: 5–250 µA.
- Filament: Dual (automatic switching with shield between filament and source box).
- Collision energy: Up to 60 eV.
- Maximum SRM and MRM speed: 800 transitions/sec or better.
- Linear dynamic range: 8×10^6.

Detector:

- Dual-stage turbo molecular pump with minimum capacity of 200 L/sec or higher.
- EI scan sensitivity: Signal-to-noise (S/N) > 1500 at m/z 272 for 1 pg OFN in EI scan.

- EI MRM sensitivity: S/N > 18,000 for the transition m/z 272 → m/z 222 for 100 fg OFN in EI MRM.
- Vent-free column changing facility should be available, allowing analysis readiness within 90 minutes or less after column replacement.

Software for Control of GC as well as GC-MS:

- 64-bit Windows-based software providing single-point control of all GC-MS parameters, injectors, and detectors.
- Must include features such as security, audit trail, system check, software integrity, and system suitability tests.
- Flexible reporting formats: method details, chromatograms, mass spectra, peak tables, quantitation results, calibration curves, status logs, text, and graphics.
- Automated tuning and file management functions with integrated library search.
- User-friendly post-run analysis with flagging capabilities.
- Complete vacuum system control, including auto start-up/shutdown and power failure protection.
- Latest licensed NIST and Wiley libraries.

Syringes & Columns:

- 2 mL gas-tight syringes – 1 no.
- Suitable columns for permanent gases and light hydrocarbons (N_2, H_2, O_2, CO, CO_2, C_1–C_5 hydrocarbons including isomers) – 2 nos.
- Suitable columns for liquid hydrocarbons (alcohols, aldehydes/ketones, organic acids, aromatics, fatty acids, diesel, gasoline, and aviation fuel range hydrocarbons) – 5 nos.

Installation Accessories:

- Branded computer with multifunctional Wi-Fi and network-enabled LaserJet printer – 1 set.
- 10 KVA online UPS with isolation transformer, 1-hour backup for GC-MS system – 1 no.
- Gas cylinders (filled) with double-stage regulators: N_2, He, and Ar – 1 each.
- Gas purification panel set for helium and argon, including filled cylinders, SS regulators, molecular sieve, moisture and oxygen traps, hydrocarbon traps, with required tubing, nuts, and ferrules.

Consumables / Spares:

- Graphite ferrules, 0.5 mm (10/pkt) – 2 nos.
- Graphite ferrules, 0.8 mm (10/pkt) – 2 nos.
- Capillary column ferrule set, 0.5 mm (10 pcs/pkt) – 2 nos.
- Septa (50 pcs) – 2 nos.

- Insert liners (split, splitless) – 5 pcs each.
- Vespel ferrules, 0.25 mm I.D. – 2 nos.
- Vespel ferrules, 0.32 mm I.D. – 2 nos.
- 20 mm crimper – 1 no.
- 20 mm decapper – 1 no.
- Column nuts (10 pcs) – 1 no.
- MS nuts (10 pcs) – 1 no.
- Insert O-rings (10 pcs) – 1 no.
- Triple gas filter kit (1/8" SS) – 1 no.
- Split filter – 1 no.
- EI filaments – 6 nos.
- Source cleaning materials – sufficient quantity.
- Vacuum oil (R-grade) – 4 L.
- Mass number calibration standards for MS.
- Headspace autosampler vials (20 mL) with caps – 200 nos.
- ALS vials (2 mL) – 1000 nos.
- Additional consumables/spares required for continuous GC-MS/MS operation for at least three years must be included. Spares must remain available for a minimum of 10 years.

Important Notes:

- Warranty: Minimum of 3 years comprehensive warranty covering parts, software, and accessories (UPS, PC, printer).
- Supplier must provide a list of GC-MS/MS users in national-level government research institutes/universities and at least three performance certificates from these institutions.

Terms and Conditions for Instruments:

- Supplier must provide installation, commissioning, and multiple training sessions (after installation, after 1 month, after 6 months, and after 1 year) for technical staff/students, covering instrument operation and structure determination. Training must be at no additional cost and include printed manuals/documents.
- Supplier must demonstrate adequate setup and capability to provide after-sales service in India, with trained service engineers available to respond to service calls within 48 hours.
- Supplier must provide detailed lists of Indian users for the quoted models with contact details. At least three purchase orders (not older than 3 years) from IITs/NITs/Central Universities/Government organizations/any reputed research & educational institute must be included with the technical bid, along with performance certificates of the quoted GC-MS/GC system from at least three Indian users.
- Pre-installation requirements must be provided immediately after order placement.
- One-time free shifting of the instrument within the next 5 years must be included.

B) Amended Technical Specifications for Gas Chromatograph (GC)

AMENDED SPECIFICATIONS FOR HIGH-SPEED GAS CHROMATOGRAPH WITH FID & TCD

GC MAINFRAME:

- Gas Chromatograph with Advanced/Electronic/Programmable Flow control technology for simultaneous pressure, temperature, and flow programming.
- Graphical user interphase with display of 7 inch or better.
- Remote functionality with web monitoring and smart device control should be available.
- Large Column Oven with temperature range from Ambient +5 °C to 450 °C or better.
- Temperature Accuracy: ±1%.
- Retention time repeatability: < 0.0008 min.
- Peak area repeatability: < 0.5% RSD.
- Constant Linear velocity mode, constant pressure mode, and constant column flow mode should be available.
- Auto ignition facility should be available.
- Self-diagnostic function with GLP/GMP support.
- Fast data transfer, acquisition speed of 500 Hz or more – should be able to "catch" very sharp peaks.
- System should have the capability to accommodate Narrow Bore (0.1 mm i.d) to Wide Bore (0.53 mm i.d) capillary columns.
- System should have the capability to accommodate simultaneously at least 2 injection units and 4 detector units.
- 6 Port valve with heating arrangement and sample loop: 500 µL, 1 mL, 2 mL & 5 mL.

Column Oven:

- Fits at least two 100 m × 0.530 mm I.D. capillary columns.
- Ambient rejection: < 0.01 °C per 1 °C.
- Temperature set point resolution: 0.1 °C or better.
- Temperature accuracy: set value (K) ±1% (calibration at 0.01 °C).
- Programmable temperature ramps: at least 20 ramps.
- Oven cool down time: 450 °C to 50 °C within 4 minutes or less.

Split/Splitless Injector – 2 nos:

- Injection mode: Split/Splitless; High pressure injection.
- Split ratio: Up to 10000:1.
- Maximum operating temperature: 400 °C.
- Supports capillary columns from 50 µm to 530 µm I.D.; electronic septum purge built-in; gas saver mode reduces gas consumption.

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- The system should be able to install 2 independent temperature-controlled injector units simultaneously.
- The system should be able to set a total flow range: 0 to 1,200 mL/min for He and H_2, with advanced/electronic flow control. Efficient gas saver mode is desirable to reduce gas consumption during standby without affecting performance.

Detectors:

1. FID:

- MDQ: < 1.2 pg C/s (dodecane).
- Linear dynamic range: 1×10^{-7}.
- Maximum operating temperature: 450 °C.
- Automatic flame-out detection and re-ignition feature must be available.

2. TCD:

- Sensitivity: > 20000 mV × mL/mg (decane).
- Dynamic range: 1×10^5.
- Maximum operating temperature: 400 °C.
- Standard EPC for carrier gases.

Auto Injector:

- Sample injection method: Liquid sample injection via micro syringe.
- Number of samples: 15 vials or more.
- Number of sample injections: minimum 1–99 injections per sample.

Software for Control of GC:

- 64-bit Windows-based software should provide single point control of all GC parameters, injectors, and detectors.
- Software should have security, audit trail, system check, software integrity, and system suitability test included as standard functions.

Columns:

- Suitable for analysis of permanent gases and light hydrocarbons up to C5 (N_2, H_2, O_2, CO, CO_2, C1–C5 hydrocarbons with all isomers) – 2 nos.

- Suitable for analysis of liquid hydrocarbons – alcohols, aldehyde/ketone, organic acids, aromatics, fatty acids, diesel, gasoline, and aviation fuel range hydrocarbons – 3 nos or more.

Installation Accessories:

- Branded Computer – 1 set.
- Filled Hydrogen, Nitrogen, Zero Air, Argon, Helium gas cylinders – 1 each.
- Double stage gas regulators for all the above cylinders.
- Gas purification panel for GC should include molecular sieve, moisture and oxygen traps, hydrocarbon traps with necessary tubings, nuts, and ferrules.
- 1 mL, 5 mL gas-tight syringes – 5 nos each.
- 2 mL vials with caps: 1000 nos or more.
- Septum: 100 nos or more.
- Auto injector syringes (5 µL, 10 µL): 5 nos each.
- Column ferrules suitable for 0.25 µm, 0.32 µm, and 0.53 µm: 20 each or more.
- Other necessary consumables, spares, tool kit etc. for at least five years of continuous operation with a list and quantity.

Important Note(s):

- Warranty: Comprehensive warranty of GC system with all accessories for a minimum of three years or more from the date of installation.
- List of users of the GC in any national-level government research institutes or universities, along with three performance certificates from these institutions/universities, should be provided.

Terms and Conditions for Instruments:

- The supplier must provide installation, commissioning, and a minimum of two training sessions (first training session during installation and another training session any time after six months from the date of installation) for a group of technical staff/students, from operating the instrument to complete structure determination/solution at site, without any additional cost, with supply of all the relevant manuals and documents in printed format.
- The supplier must demonstrate that they have appropriate set-up and capability to provide after-sales service effectively in India for prompt service support along with a number of service engineers specially trained on the offered system. The supplier should ensure that service engineers will be available to attend the service call within 48 hrs of intimation to avoid longer downtime of the instrument.
- The supplier must provide detailed lists of Indian users for quoted models and contact details. At least three purchase orders with price information not older than 3 years from IITs/NITs/Central University/any other reputed research & education Institute should be included with the technical bid. The performance certificate of quoted GC system from Indian users (at least 3) should be included along with the technical bid.

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- Necessary pre-installation advice should be sent immediately after placement of the order.
- One-time free shifting of instrument in the next 5 years.

Except above amendments, all other terms & conditions of the tender will remain unchanged.