

NATIONAL INSTITUTE OF TECHNOLOGY: TIRUCHIRAPPALLI - 620 015
DEPARTMENT OF CHEMICAL ENGINEERING

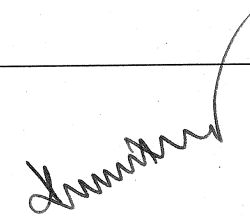
20.02.2019

Minutes of the pre-bid Meeting **Venue: Conference Room, Chemical Engg** **Time: 3.00 p.m.**

Tender Notification No.: FIST2017/CHL/GCMS

Specification for GC-MS

Original tender specification	Amended specification
GC Specifications System should support two inlets and two detector ports along with Single quadrupole MSD system and should have electronic pneumatic / pressure controls for all the gases. Instrument should have Chromatography Data system which is based on Microsoft Windows operating system for instrument control, data acquisition, data analysis, quantization, automation & customization with online and offline sessions. System should be configured with 2 valves with TCD for permanent gas analysis.	GC Specifications System should support two inlets and two detector ports along with Single quadrupole GCMS system and should have electronic pneumatic / pressure controls for all the gases. Instrument should have Chromatography Data system which is based on Microsoft Windows operating system for instrument control, data acquisition, data analysis, quantization, automation & customization with online and offline sessions. System should be configured with 2 valves with TCD for permanent gas analysis.
Column Oven Provision to install two or more columns Operating temp range of oven from near ambient to 450 C or better Oven temperature ramp rate of oven should be 120°C or better Possible to program 15 temp ramps (16 plateaus) or better Heating rate: 0.1°C/ min to 100°C/ min or better (minimum range 0.1 to 45°C/ min.	No Amendment
Injectors Capillary column and on-column injectors should be quoted as specification mentioned below and should have independent automated flow/pressure control for both injectors	No Amendment
Split/splitless injector Maximum temperature: 400 °C Advanced electronic flow control modules with Pressure set points adjustable in increments of 0.001 psi, with typical control ± 0.001 up to 99 psi. Split ratio upto 7000:1 and suitable for all capillary column from 50 μ m to 530 μ m. Efficient gas saver mode built-in to reduce gas consumption during standby.	No Amendment



<p>On-column injector Must have direct injection onto cool capillary column for biodiesel application for glycerol and total glycerin as per EN14105 or ASTM D6584 methods. Maximum temperature: 450 °C. Temperature programming in 3 ramps or tracking oven Must support Automatic liquid injection supported directly onto columns 0.25 to 0.53 mm id. Automated pressure control upto 100 psi</p>	<p>No Amendment</p>
<p>Flame Ionization detector – 1 No.</p> <ul style="list-style-type: none"> • Maximum operating temperature upto 450 °C or better. • Minimum Detectable limit <1.4pg c/s for tridecane or any equivalent compound • Linear dynamic range >10⁷ or better • Should be provided with electronic control system • Data rate: 500 Hz or better • Flame out detection and automatic re-ignition • Detector gas flow control through Automatic Pneumatic control system 	<p><u>Data rate: 300 Hz or better</u></p>
<p>TCD Detector - 1 No.</p> <ul style="list-style-type: none"> • Linearity 10⁵ or better • Maximum temperature up to 350 °C or better • Detector gas flow control through Automatic Pneumatic control system or equivalent facility and should have Fluidic switching rapid stabilization from turn - on, low-drift performance. • Software flow control of reference gas 	<p>No Amendment</p>
<p>There should be a provision to split the sample from single injection to Two different detectors and get results for two detectors simultaneously.</p>	<p><u>Can be deleted (This provision is not required)</u></p>
<p>Single Quadupole mass spectrometer Specifications LAN based single quadruple MS system with EI ionization with appropriate software for instrument control and data process from original manufacturer.</p> <ul style="list-style-type: none"> • Non-coated inert EI source with dual filament and heatable upto 350°C • Electron energy should be max 220 eV and Emission current upto 300µA 	<p>Single Quadupole mass spectrometer Specifications LAN based single quadruple MS system with EI ionization with appropriate software for instrument control and data process from original manufacturer.</p> <ul style="list-style-type: none"> • Non-coated inert EI source with dual filament and heatable upto 350°C • Electron energy should be max 220 eV and Emission current upto 300µA

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- Quadrupole should be made up of inert material with preferably hyperbolic shape to have better mass transfer efficiency and optionally to be heatable upto 180°C to keep it clean from dirty matrix or equivalent technology
- Mass range (m/z) upto 1,000amu with mass axis stability 0.10 μ for 48 hrs
- Scan rate (electronic) of 18000 u/s or better.
- Turbomoleculer vacuum pump capacity upto 250L/s
- System should have Electron multiplier detector with long life and better sensitivity with electronic Dynamic range (electronic) 10^6
- The system should have heated GC/MS interface with temperature control upto 350°C
- Software should provide for instrument control, data acquisition, Qualitative & Quantitation analysis with in - build chromatographic deconvolution facility and should be supplied with Pre- loaded PC along with suitable laser printer from manufacturer.
- Software should have chromatographic deconvolution facility for screening of co-eluting compounds. The sensitivity of system should be as followed and demonstrated at Installation:
- EI SIM Instrument Detection Limit: 10 fg or less for OFN that statistically derived at 99% confidence level from the area precision of eight sequential splitless injections using 100fg/ μ L OFN Standard using 30m x 0.25mm ID x 0.25 μ m column Library and database: The following libraries or database should be provided.
- latest version of NIST library with license.

Autosampler

- Auto liquid sampler with 16 vial capacity should be quoted.
- The autosampler must allow injection volume settings of 1% to 50% of syringe volume in increments of 1%.
- The GC shall allow a settable viscosity delay of 0-7s (after plunger stroke reaches the top)
- Capable of handling large volume injection with syringe size from 0.5 to 250 μ l

Gas analysis system

Should have 6- position valves each for sampling with 1mL loop and column isolation for molecular sieve column

Quadrupole should be preferably hyperbolic shape and optionally to be heatable to keep it clean from dirty matrix or equivalent technology

- Mass range (m/z) upto 1,000amu with mass axis stability 0.10 μ for 48 hrs
- Scan rate (electronic) of 18000 u/s or better.
- Turbomoleculer vacuum pump capacity upto 250L/s
- System should have Electron multiplier detector with long life and better sensitivity with electronic Dynamic range (electronic) 10^6
- The system should have heated GC/MS interface with temperature control upto 350°C
- Software should provide for instrument control, data acquisition, Qualitative & Quantitation analysis with in - build chromatographic deconvolution facility and should be supplied with Pre- loaded PC along with suitable laser printer from manufacturer.
- Software should have chromatographic deconvolution facility for screening of co-eluting compounds. The sensitivity of system should be as followed and demonstrated at Installation:
- EI SIM Instrument Detection Limit: 10 fg or less for OFN that statistically derived at 99% confidence level from the area precision of eight sequential splitless injections using 100fg/ μ L OFN Standard using 30m x 0.25mm ID x 0.25 μ m column Library and database: The following libraries or database should be provided.
- latest version of NIST library with license.

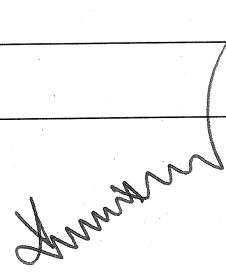
Auto liquid injector with 8 (or) 16 vial capacity should be quoted.

- The autosampler must allow injection volume settings of 1% to 50% of syringe volume in increments of 1%.
- Capable of handling large volume injection with syringe size from 0.5 to 250 μ l

No Amendment

<p>8ft x 1/8" HayeSep Q 80/100 and 9ft x 1/8" MolSieve 5A 80/100 column with Stainless steel tubing material should be quoted.</p> <p>Valves should be positioned in heated valve box for temperature control and pneumatic actuators for automation. Independent automated flow/pressure control should be provided for carrier gas control.</p> <p>Reducer for 1/16" to 1/8" & 1/8" to 1/4" , unions 1/8: and 1/8 inch Ball Valve should be added for online and offline gas sampling.</p>	
<p>Capillary columns</p> <p>Fused silica capillary column of dimension 30m x 0.25mmx 0.25 µm coated with DB-FFAP</p> <p>(ii) Fused silica capillary column of dimension 30m x 0.25mmx 0.25 µm coated with DB-5.</p> <p>Biodiesel columns for the Analysis of ester and linolenic acid methyl esters contents as per EN14103 and determination of free glycerol contents as per EN 14106 and Glycerides analysis as per EN 14105.</p>	No Amendment
<p>Spares and Consumables</p> <p>(ii) Microlitre liquid syringes-10 Nos (10 µl)</p> <p>(iii) Microlitre gas tight syringes- 5 Nos (5 ml)</p> <p>(iv) Ferrules & Nuts - 25 Nos</p> <p>(v) Injection port septa - 25 Nos</p> <p>(vi) Glass liner for split and splitless (2 each)</p> <p>(vii) Glass liner for injection ports- 5 Nos</p> <p>(viii) Graphite ferrule 0.5mm and 0.8 mm (5 each)</p> <p>(ix) Capillary column cutter</p> <p>(x) Gas sampling bulbs 10 nos.</p> <p>(xi) O-Rings (10 No's of each type)</p> <p>(xii) EI Filaments (5 no.)</p> <p>(xiii) Gas tube cutter (02 no.)</p> <p>(xiv) Tool kit</p>	No Amendment
<p>Software</p> <p>GC and all its modules should be controllable through single software. Instrument software for acquisition, Qualitative and Quantitative analysis with unlimited academia distribution should be provided. It is requested to provide at least one free software version upgrade in the future.</p>	No Amendment

<p>(ii) Software should have qualitative like in - built chromatographic deconvolution features, spectral extraction and matching, Quantitative features like calibration curve preparation, QC check sample etc.</p>	
<p>Gas cylinders</p> <ul style="list-style-type: none"> • Nitrogen and Argon gas cylinders (1 each) • Hydrogen gas cylinder- 1 No. • Air cylinder- 1 No. • He Cylinder – 1 No. • All the required gas cylinders with dual stage regulators have to be supplied. • Gas cylinders with Two Stage Cylinder Regulator with Brass Chrome plated body with S.S. Diaphragm for Helium should be provided • Suitable Gas Purification & Control Panel with pressure Regulator for Helium be provided 	<p>No Amendment</p>
<p>Gas Purification System</p> <p>(i) Complete gas purification system for all the required gases</p> <p>(ii) Carrier line -2 Nos (One for Nitrogen gas and another one for any inert gas)</p> <p>(iii) Fuel line - 2 Nos (One for Hydrogen and another one as spare hydrogen line)</p> <p>(iv) Oxidant line - 2 Nos (One for compressor and another one for zero air)</p> <p>(v) Carrier line should have moisture trap, hydrocarbon trap and oxygen trap.</p> <p>(vi) Fuel lines and Oxidant lines should have moisture trap.</p>	<p>No Amendment</p>
<p>INSTALLATION AND TRAINING</p> <p>Complete installation on site, training for minimum of 2 days at site (twice in a year up to working warranty at supplier's own cost), validation with control as per applicable regulatory standards and performance demonstration of complete system for its working in line with technical specification along with accessories is must after delivery.</p>	<p>INSTALLATION AND TRAINING</p> <p>Complete installation on site, application training for minimum of 2 days at site (<u>once in a year up to working warranty at supplier's own cost</u>), validation with control as per applicable regulatory standards and performance demonstration of complete system for its working in line with technical specification along with accessories is must after delivery.</p>
<p>Warranty</p> <ul style="list-style-type: none"> • Instrument System must be quoted with 36 months of warranty 	<p>No Amendment</p>



<ul style="list-style-type: none"> Vendor should have minimum 20 GC-MS installations in reputed government institutions in India in last ten years. User list with contact details must be provided Quote for Labor AMC after warranty period for three years must be provided. 	
<p>Optional Back flash: Quote for post column or mid column back flash should be provided (Replacement of GC column without venting MS vacuum which results in elimination of GC/MS downtime).</p>	No Amendment

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Pre-Bid Meeting - GCMS

Tender Notification No: FIST2017/CHL/GCMS

Date: 20.02.2019, Venue: Conference Hall, Chemical Engg., NITT

S No	Name of the official with Firm address	Signature
1.	K. ARUNPRAKASH. 9380179166 TOSHUVIN ANALYTICAL P.LTD. CHENNAI	K. Arunp.
2.	S. SANKARAN CHERMO ISHAR Scientific Chennai	S. Sankaran 875459252
3	B. Jaganmohan - Agilent, Chennai	B. Jaganmohan 7358035989
4	Opendra Sinha, Agilent, Chennai	Opendra Sinha
5	K. MUTHUKOMAR, Prof, NITT	K. Muthukumar
6.	A. ARUNAGIRI, ASSO. PROF, NITT	A. Arunagiri
7	R. Karvembu, Prof, NITT	R. Karvembu
8	K.M. Meera S. Begum	K.M. Meera S. Begum