

**Pre bid meeting held on 5<sup>th</sup> March 2020**

**Chapter 4: LC-MS/MS(TQD) funded under TIES programme, Ministry of Commerce & Industry, Government of India**

**Technical Specifications**

| <b>LC-MS/MS(TQD) (01 unit)</b> |   |                               |
|--------------------------------|---|-------------------------------|
| <b>S. No.</b>                  | <b>Specification</b>  | <b>Amended Specifications</b> |
| 1.                             | <b>LC-MSMS (Triple Quadrupole):</b> A Bench Top High sensitive Triple/Tandem Quadrupole LCMS/MS System with facility to either use as standalone or connect to a Fast Liquid Chromatography system using lesser than 2 µm particle size columns for high sensitivity for both qualitative and quantitative analysis         | No Change                     |
| 2.                             | <b>Mass Range</b> 10 to 2000 amu or better  | No Change                     |
| 3.                             | <b>Scan speed</b> Should have the scan speed of 17,000 amu/sec or better in QQQ mode.   | No Change                     |
| 4.                             | <b>Mass stability</b> Less than 0.1 Da over a 24 hour period.   | No Change                     |
| 5.                             | <b>Interface:</b> Dual/equivalent orthogonal or off axis source or any other equally efficient technology capable of avoiding interferences from solvents and other extraneous matter, handling large batches of complex sample matrix over a long period of time without performance degradation.                          | No Change                     |
| <b>Ionization source</b>       |   |                               |
| 6.                             | Combined/dedicated or equivalent ESI and APCI sources to be provided, with facility of interchanging easily by the user, and auto-detection of installed source by the instrument and software. The ionization must be done both in a positive & negative modes.  | No change                     |
| 7.                             | The combined/dedicated or equivalent ionization (ESI & APCI) source must operate along with reference spray to facilitate automated accurate mass measurements within single LCMS experiment. The instrument should be capable of internal reference mass correction for MS and MS/MS operation without losing sensitivity. |                               |
| 8.                             | Switching between ESI and APCI should be ≤ 20 ms  | Omitted                       |

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| 9.                 | The source should be easily removable from the system to facilitate user cleaning without venting the vacuum, with automatic standby of system while the source / probe is being removed   | No Change   |
| 10.                | The source shall have a flow rate compatibility from 50 $\mu\text{L}/\text{min}$ to 2000 $\mu\text{L}/\text{min}$ , without flow splitting in both ESI and APCI modes  | No Change   |
| 11.                | Desolvation temperature for sources should be 350° C or better   | No Change   |
| 12.                | All source parameters to be adjustable through software.   | No Change   |
| 13.                | <b>Source cleaning</b> The cleaning of the source should be done without venting the system and facility to Vacuum Interlock should be provided. The Vacuum must remain intact during the cleaning, Source interchange or Servicing of the system. Vendors must assure the same in writing.                        | No Change   |
| 14.                | <b>Infusion Device</b> Infusion device must be integral to the instrument for direct sample introduction and must be controllable from the instrument software.  | <b>Infusion Device</b> Infusion device must be integral <b>or modular</b> to the instrument for direct sample introduction and must be controllable from the instrument software. |
| 15.                | <b>Vacuum system</b> A robust high efficiency Oil less vacuum system with minimum maintenance and utility with low noise level and automatic vacuum lock system.   | No Change   |
| 16.                | <b>Triple Quadrupole</b> Quadrupoles having high standards of mechanical tolerances and minimum coefficient of Thermal expansion to ensure highest mass stability with Prealigned pre filters to ensure excellent focusing of Ions into all the Quadrupoles for high sensitivity and resolution in both Q1 and Q3. | No Change   |
| 17.                | <b>Instrument Detection limit</b> Should be 0.5gf or less (Proof of Statement must be provided)  | <b>Instrument Detection limit</b> Should be <b>0.6 fg</b> or less (Proof of Statement must be provided)   |
| 18.                | <b>Mass Resolution</b> Must be automatically adjusted to desired resolution (0.50 Da, 0.75 Da or 1.00 Da FWHM)   | No Change   |
| <b>Sensitivity</b> |  |   |
| 19.                | MRM ESI +ve 1pg On column reserpine should give chromatographic S/N greater than 500,000:1 without smoothing MRM transition 609>195 at unit resolution (Proof of Statement must be provided)   | No Change   |

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| 20.             | MRM ESI-ve 1pg On column   | No Change   |
| 21.             | Chloramphenicol should give chromatographic S /N greater than 500,000:1 without smoothing MRM transition 321>152 at unit resolution (Proof of Statement must be provided)  | No Change   |
| 22.             | Documentary evidence to be submitted along with quotation. For ten injections, %RSD should be <5%. Chromatograms to be provided, with details of mobile phase, column and injection volume. Statistical treatment used to determine S/N ratio is to be specified along with raw data.  | No Change   |
| 23.             | <b>Collision cell</b> Specially designed collision cell to allow use of very low Dwell times (1 milliseconds) without sacrificing sensitivity and eliminate Cross-Talk to enable Multiple MRM Transition Studies within a single run.  | No Change   |
| 24.             | <b>MRM Acquisition rate</b> Should be capable of minimum 500 MRM data points /sec in a single time period, with no loss in sensitivity for co-eluting components at any one point of time.   | No Change   |
| 25.             | <b>Operating Modes</b> Tandem mass spectrometry should have following scan options<br>a. Full scan<br>b. Selected ion monitoring/recording (SIM/SIR)<br>c. Product ion scanning<br>d. Precursor ion scanning<br>e. Neutral loss/gain scanning<br>f. Multiple reaction monitoring<br>g. Simultaneous full scan and MRM along with matrix monitoring to be performed in a single run | No Change   |
|                 | h. +ve / -ve polarity switching time between alternate MRM scans is minimum 15ms   | h. +ve / -ve polarity switching time between alternate MRM scans is minimum <b>25ms</b> |
|                 | i. Automatic and manual tuning.<br>j. Information dependent acquisition system or equivalent scan mode of MRM to high sensitivity product ion scan for library confirmation.   | No Change   |
| 26.             | <b>Dynamic range</b> 6 orders of magnitude or better   | No Change   |
| <b>Detector</b> |  |   |
| 27.             | Long life highly efficient electron multiplier or photomultiplier detector or equivalent technology  | No Change   |
| 28.             | Must operate both +ve and -ve ion mode and back  | No Change   |

| <b>UHPLC</b>                  |   |   |
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| 29.                           | The Ultra-High Pressure Liquid Chromatography (UHPLC) system should be capable of running with <2 micrometer particle size columns  | No Change   |
| 30.                           | System should have a quaternary pump with an operating pressure of minimum 15000 psi or higher. Purging of pumps must be automated through the software. The flow rate range should be 0.010 to 2.000 mL/min, in 0.001 mL increments.   | No Change   |
| 31.                           | The instrument should have in-built Vacuum degasser facility with minimum four lines and should be efficient to remove dissolved air online.  | No Change   |
| 32.                           | System Delay Volume should be less than < 400 µl, independent of system backpressure & with standard mixer for higher sensitivity. The total System band spread should be ≤15µl or better   | No Change   |
| 33.                           | The system should have an integrated / inbuilt auto-sampler capable of holding approx 90 vials (1.5 to 2ml) or more. The auto-sampler should have cooling facility upto 5 °C or better and heating upto 40 °C or better. Programmable injection volume from 0.1 µl to 10 µl or better must be available with Integral, Active & Programmable needle wash. The carryover of the autosampler must be less than 0.002% or better.                  | The system should have an integrated / inbuilt or modular auto-sampler capable of holding approx 2 or more tray with 90 vials (1.5 to 2ml) or more. The auto-sampler should have cooling facility upto 5 °C or better and heating upto 40 °C or better. Programmable injection volume from 0.1 µl to 10 µl or better must be available with Integral, Active & Programmable needle wash. The carryover of the autosampler must be less than 0.002% or better. |
| 34.                           | The system should incorporate a column oven with a temperature control of ambient to 90°C or better.  | The system should incorporate a column <b>capacity of two or more</b> oven with a temperature control of 10 °C below ambient to 90°C or better.   |
| <b>Column and Accessories</b> |   |   |
| 35.                           | Suitable sub 2 micron particle size column (100mm length x 2.1 mm diameter) of C18 – 3 nos should be quote should be quote  | No Change   |
| 36.                           | Various other chemistry columns each three should be quoted with the system. <ul style="list-style-type: none"> <li>• 3.5-µm particle 4.6 × 150 mm Xbridge amide column (Waters) (03 numbers)</li> <li>• Luna Amino (NH<sub>2</sub>) column (3 µm, 100A 2 × 150 mm, Phenomenex) (03 numbers)</li> <li>• Phenyl Hexyl column (3 µm, 100A 2.1 × 150 mm)</li> <li>• Phenomenex (03 numbers)</li> <li>• RRHD SB-CN column (1.8 µm, 3.0 ×</li> </ul> | Various other chemistry columns each three should be quoted with the system. <ul style="list-style-type: none"> <li>• 3.5-µm particle 4.6 × 150 mm amide column (03 numbers)</li> <li>• Amino (NH<sub>2</sub>) column (3 µm, 100A 2 × 150 mm, ) (03 numbers)</li> <li>• Phenyl Hexyl column (3 µm, 100A 2.1 × 150 mm) (03 numbers)</li> <li>• RRHD SB-CN column (1.8 µm, 3.0 × 100 mm) (03 numbers)</li> <li>• High strength Silica SS UPLC T3</li> </ul>     |

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|                 | <p>100 mm, Agilent Technologies) (03 numbers)</p> <ul style="list-style-type: none"> <li>Acquity HSS UPLC T3 column (1.8 µm particle 50 x 2.1 mm) (Waters, Milford, MA) (03 numbers)</li> <li>Agilent Zorbax Eclipse XDB C18,3.0 x100mm, 3.5 µm (03 numbers)</li> </ul>   | <p>column (1.8 µm particle 50 x 2.1 mm) (03 numbers)</p> <ul style="list-style-type: none"> <li>Zorbax Eclipse XDB or equivalent chemistry C18,3.0 x100mm, 3.5 µm (03 numbers)</li> </ul>   |
| 37.             | Vial with Cap and Pre-slit PTFE/Silicone Septa – 1000 nos   | <p>Vial with Cap and Pre-slit PTFE/Silicone Septa – 1000 nos</p> <p><b>Glass Insert with bottom-spring -500 numbers should be quoted with the system</b></p>  |
| 38.             | Suitable Peek Tube Cutter – 2 no  | No Change   |
| 39.             | Suitable Stainless Steel Tubing Cutter with Blades – 2 no   | No Change   |
| 40.             | Capillary tube=03   | No Change   |
| 41.             | <ul style="list-style-type: none"> <li>Various solvents LCMS grade ACN (40L), Methanol (40L), Toluene (5L), IPA (30L) Acetone (05 litre), chloroform (05 litre) and ethyl acetate (05 litre) should be quoted with the system.</li> <li>Solvent will be arranged by supplier for the smooth demonstration and qualification of the system.</li> </ul> | <ul style="list-style-type: none"> <li>Various solvents LCMS grade ACN (40L), Methanol (40L), Toluene (5L), IPA (30L) Acetone (05 litre), chloroform (05 litre), <b>Methyl tertiary butyl ether (05 litre AR grade)</b> and ethyl acetate (05 litre) should be quote with the system.</li> <li>No Change</li> </ul> |
| 42.             | Capillary wire (charged)-04   | No Change   |
| 43.             | Solvent bottles (10 no.=500 ml, 10 no.= 1L, 10 no.=250mL and 10no.=100mL)   | No Change   |
| 44.             | Branded Micropipette with stand each (0.5-10 µL, 100-1000µL, 20-200µL and 10-100µL)   | No Change   |
| 45.             | Falcon tubes (15 mL and 30mL) 2000 no. each   | No Change   |
| 46.             | <b>UPLC waste reservoir</b> 2 numbers: Capacity up to 8-10 liters, compatible for storage of polar and non-polar solvents. Should be supplied with 30 meters connecting tube  | No Change   |
| <b>Software</b> |   |   |
| 47.             | Application software for quantitative applications having the additional requirement of Quality Control (QC) checks to satisfy statutory or regulatory requirements must be available.  | No Change   |
| 48.             | This application must compatible with LC/MS   | No Change   |

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|     | and LC/MS/MS data. Data can be full scan, SIR/SIM or MRM.  |           |
| 49. | Data Acquisition, Peak Integration, Calibration, Quantification and QC calculations must be fully automated.   | No Change |
| 50. | Quantification and QC parameters must be stored for each compound and individually selected and loaded into new methods.   | No Change |
| 51. | The quantification method editor must be viewable in page view or as a spreadsheet   | No Change |
| 52. | This application software must allow the monitoring of the molecular ion plus up to 4 confirmatory ions.   | No Change |
| 53. | Technology for system optimization and status monitoring, technology should monitor and perform the following parameter: <ul style="list-style-type: none"> <li>- System parameters checking and alerts</li> <li>- Integrated sample/calibrant delivery system and programmable divert valve</li> <li>- Automated mass calibration</li> <li>- Automated sample tuning</li> <li>- Automated SIR and MRM method development</li> <li>- LC/MS system checks-automated on-column performance test.</li> </ul>  | No Change |
| 54. | This application software must flag samples in the browser report when: <ul style="list-style-type: none"> <li>- the ion ratios fall out-with the user-defined values</li> <li>- the maximum blank acceptance level (user input) has been exceeded</li> <li>- the maximum concentration limit (user input) has been exceeded</li> <li>- the concentration is below the reporting concentration limit (user input)</li> <li>- the concentration falls below the minimum recovery % level (user input)</li> <li>- the concentration falls above the maximum recovery % level (user input)</li> <li>- the coefficient of determination for a calibration curve falls below a user-set level</li> <li>- QC samples fall outside a user-defined number of standard deviations from the mean</li> <li>- the peak of the compound of interest falls below a user defined S/N ratio</li> </ul> | No Change |
| 55. | Software should have the latest library  | No Change |

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|   | database of around 1500 compounds viz. (Human metabolome, Antibiotic residues, veterinary drugs residue, Aminoglycosides, macrolides, Dyes, Mycotoxins, Vitamins, Pesticides, etc.)  |  |
| 56.   | Pesticide database should contain Molecular formula, Mono isotopic mass, Parent ion, Cone voltage(V), Product ion 1, Collision energy(eV) Product ion 2, RT and sensitivity.   | No Change  |
| 57.   | Software must be complied with GLP/GMP & 21 CFR PART 11 & documents must be submitted related to same.   | No Change  |
| <b>Workstation &amp; Accessories:</b>                                     |  |  |
| 58.   | <p>A Workstation should be provided for controlling the mass spectrometer, the LC and the auto-sampler with data acquisition &amp; for data processing and analysis with minimum following specification:</p> <ul style="list-style-type: none"> <li>● Memory / RAM: Minimum 50 GB or higher</li> <li>● Hard disk: 10 TB or better</li> <li>● CPU: Dual-Processor, 3.5 GHz or better</li> <li>● Operating system: Windows 10, 64 - bit or better.</li> </ul> | <p>A Workstation should be provided for controlling the mass spectrometer, the LC and the auto-sampler with data acquisition &amp; for data processing and analysis with minimum following specification:</p> <ul style="list-style-type: none"> <li>● Memory / RAM: Minimum 50 GB or higher</li> <li>● Hard disk: 10 TB or better</li> <li>● CPU: Dual-Processor, 3.5 GHz or better</li> <li>● License version of latest windows professional OS &amp; latest MS-Office professional and driver with original CD.</li> <li>● License version of Adobe creative cloud</li> </ul> |
|   | <ul style="list-style-type: none"> <li>● 17-inch LCD monitor.</li> </ul>   | <ul style="list-style-type: none"> <li>● 27-inch LCD monitor.</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>● 1 Laser jet printer (03 in one).</li> </ul> <p>All hardware and software including drivers, monitor, device interfaces cards/network must be preinstalled and preconfigured on the computer provided.</p>   | No Change  |
| 59.   | <b>Start-up Kit</b> LC-MS/MS start-up kit should be supplied as standard   | No Change  |
| <b>Instrument and Software Qualification Service &amp; Certification:</b> |  |  |
| 60.   | The instrument must be "Qualified" along with the Software. Necessary reagents along with Documents must be provided for valid "Instrument Qualification, Operational & Performance Qualification" of the instrument along with Specification check during the installation.   | No Change  |
| 61.   | The vendors must quote the Qualification kits with defined list of items along with valid Cat. No./Product ID etc.   | No Change  |

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| 62.           | During installation and qualification, Instrument should perform as per submitted specification in presence of user.   | No Change   |
| 63.           | <b>Nitrogen Generator with in-built compressor</b> A suitable imported noise free nitrogen gas generator with in-built compressor, filters, or any other accessory required for functioning of system, should be supplied to take care gas requirements for ionization source                          | <b>Nitrogen Generator with in-built compressor</b> A suitable imported noise free nitrogen gas generator with <b>70 L/Min capacity</b> with in-built compressor, filters, or any other accessory required for functioning of system, should be supplied to take care gas requirements for ionization source |
| 64.           | <b>Warranty</b> of the instrument along with Nitrogen generator and UPS must be 3 (Three) years comprehensive gas from the installation.   | <b>Warranty</b> of the instrument along with Nitrogen gas generator and UPS <b>with battery</b> must be 3 (Three) years comprehensive from the installation. Price details for additional five years of AMC after completion of three years of warranty and five years of AMC to be quoted                  |
| <b>Others</b> |  |   |
| 65.           | The other gases (2 nos) along with regulator should also be supplied along with the system   | No Change   |
| 66.           | Standards/reagents and solvent required for successful installation must be quoted.  | No Change   |
| 67.           | Installation must be done at user's site with no extra costs involved. A one week (at least) general entry-level training-cum-workshop and advanced-level training-cum-workshop must be arranged at the user's site by the vendor on experimental and data analysis part, with no extra cost involved. | No Change   |
| 68.           | Proof of Performance documents must be provided with the Compliance sheet.   | No Change   |
| 69.           | The Vendor must submit at least 5 or more, latest customer details / PO copies / references of the same model/similar model supplied in India.   | No Change   |
| 70.           | Satisfactory performance certificate for quoted model taken from government organization along with technical bid shall be submitted.  | No Change   |
| 71.           | The model offered by the vendor should have capability to demonstrate the above mention parameter in presence of user.   | No Change   |
| 72.           | All provided brochures or technical data sheet should be available in supplier's public website.   | No Change   |
| 73.           | <b>Hardware:</b> Both MS and LC should be from same manufacturer.  | No Change   |
| 74.           | <b>Furniture</b><br>Vendor should quote as per specifications. NIPER-Guwahati will provide only empty room with electrical connections. Vendors will have  | No Change   |



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|            | to make arrangements for all the suitable furniture including granite table with chair, lab stool (02 numbers) and other accessories for the successful operation of the equipment.  |  |
| <b>75.</b> | <p><b>Manpower</b> for 3 year PhD Pharmacy/Analytical Chemistry/Chemistry or M.Sc. (Analytical chemistry/chemistry) With 4 years' experience</p> <p>Prior experience in Mass spectrometer/HPLC/LC-MS handling preferable. Salary: Rs. 50,000/-consolidated per month</p> | <p><b>Manpower</b> for 3 year (PhD qualification with minimum of 1 years experience or Masters degree with 4 years experience)</p> <p>Prior experience in Mass spectrometer/HPLC/LC-MS handling preferable. Net Salary: Rs. 50,000/-consolidated per month <b>with 5% increment every year</b></p> |