

1 Functional Requirements

The equipment is intended to be coupled with a Liquid Chromatography Tandem Quadrupole Mass Spectrometry (LC-MS/MS) for the online automated analysis of Amphetamines, Ketamine and O6-Monoacetylmorphine in biological samples. The technical specification for LC-MS/MS system is provided in Part 3: Requirement Specification of Equipment 1.

Tenderer is required to state the model(s) and name(s) of manufacturer(s) of LC-MS/MS System that can be coupled with the proposed Online Automated Extraction and Sample Injection System: _____

2 Technical Requirements

The system must be able to perform automated extraction using Disposable Pipette Extraction tips (DPX), liquid-liquid extraction and sample injection to Equipment 1: LC-MS/MS system.

Part A: Hardware Specifications**Part B: Software****Part C: Instrumental Setup and Miscellaneous****Part D: Warranty & Post Warranty Comprehensive Maintenance Services****Part A – Hardware Specifications****A.1: Type of System**

- XYZ robot with Syringe only concept.
- $\pm 0.1\text{mm}$ positional accuracy or better.
- Can be used as stand-alone unit as well as for online injection to LC-MS/MS systems.
- To include LC injection valve for online LC injection.
- Dimensions must not exceed the length of 180 cm and depth of 80 cm.
- Dual sampling units with exchangeable independent syringes.
- Capable of performing online automated extraction using DPX tips, liquid-liquid extraction and sample injection to LC-MS/MS.
- DPX holding rack for a minimum of 98 DPX tips.

A.2: Control

- By software via either RS232C or LAN/Ethernet communications.
- Keypad

A.3: Sampler

- XY Unit should be at least 120cm wide to allow multiple options to be attached.
- Shall have at least two independent syringe units controllable by software.

A.4: Disposal Pipette Tip (DPX) Handling

- Must be able to handle DPX tip for extraction.
- Must allow the use of 2.5 ml syringe which can either pull sample up through DPX tip or dispense down into tip to minimise sample carry over.
- The holding rack must be able to fit culture tubes of dimension Ø12 x 32 mm.
- Must allow the use of 2 ml eluate collection vials.
- Must have needle wash station.
- Must have at least 6 solvent reservoirs for extraction solvent, reconstitution buffer and other uses.

A.5: Sample Injection to LC-MS/MS

- Must have a holding loop of minimum 100 µl to reduce carry over to the syringe.
- Must be able to use 100 µl syringe which can either pull sample up or dispense down the holding loop into vials.
- Must have carry over less than 0.004% (40 ppm).
- Must have at least 2 wash stations for the injector system.
- LC Injector valve must be able to hold 2 µl sample loop.

Part B – Software**B.1: Software**

- PC based and communicate via RS232C or LAN.
- Must have intuitive sample sequence building capabilities using simple terms that minimally includes ADD, MIX, MOVE, EVAPORATE, GET, PIPETTE.
- Must have a sample scheduler to provide an at-a-glance overview of the total time required for preparation of the entire batch, current status and time-to-go.
- Must have the function to schedule the automated sample preparation steps and instrumental analysis concurrently and simultaneously.
- Must have real-time software monitoring of all modules and parameters.
- Must have instrument activity log file and service log file functions to ensure traceability and to facilitate troubleshooting.
- Must be compatible with the LC-MS/MS software to allow for online automated sample extraction and injection.
- Software must be compatible with Windows 7 or above.

Part C – Instrumental Setup and Miscellaneous**C.1: Online Automated Extraction and Sample Injection System**

- The system as a whole (Part A and B) must be fully compatible and able to seamlessly integrate with LC-MS/MS system for online automated sample extraction and analysis system.
- The Tenderer must have prior experiences with such setup. The Tenderer must demonstrate their ability and knowledge in setting up such system. Please provide the list of previous setup of LC-MS/MS coupled with online automated sample extraction and analysis system Annex E to Part 3 – Performance Summary.

C.2: Electrical Requirements

- The unit shall be able to operate directly on the Agency's existing electrical switched socket of rating 230V ac $\pm 10\%$, 50 Hz ± 2 Hz, single phase/triple phase ac supply.

C.3: Risk Assessment

- The contractor must perform on-site risk assessment. Risk Assessment Report in 5x5 matrix shall be submitted and approved prior to the delivery of the unit.

C.4: Installation, Commissioning and training

- The offer must include delivery, installation and commissioning of the unit and training to be provided for approximately 3 laboratory staff, which minimally include operation of hardware, software and advanced maintenance.
- The installation must include the coupling and interface of the automated sample extraction by DPX and injection to the Equipment 1: LC-MS/MS system.
- The consumables, accessories and etc that required to complete the setup and commissioning of the Online Automated Extraction and Sample Injection System as well as interface with Equipment 1 must be provided.

C.5: Schedule of Rates

- The Tenderer shall quote in the Schedule of Rates, with itemised pricing for the optional accessories required for the complete setup of the Online Automated Extraction and Sample Injection System.

Part D – Warranty & Post Warranty Comprehensive Maintenance Services**D.1: Warranty**

- The system shall come with at least one (1) year warranty for the whole system that comprises equipment hardware and software after successful commissioning and

full integration of the Online Automated Extraction and Sample Injection system with Equipment 1: LC-MS/MS system.

- The warranty shall minimally include the following:
 - a) provision of unlimited breakdown calls and on-site services during Operating Hours i.e. Monday to Friday from 8:30 am to 6pm excluding Saturday, Sunday and Public Holiday;
 - b) provision of all replacement parts;
 - c) to provide one (1) preventive maintenance per year; and
 - d) any software update and/or revisions

D.2: Post warranty

- The Tenderer is required to quote comprehensive maintenance contract for three (3) years after the warranty period. The comprehensive maintenance contract shall provide coverage for overall system including hardware and software. The price quoted shall minimally include the following:
 - a) provision of unlimited breakdown calls and on-site services during Operating Hours;
 - b) provision of all replacement parts;
 - c) to provide one (1) preventive maintenance per year; and
 - d) any software revisions

D.3: Performance of Service

- The services to be performed by the Contractor shall consist of Preventive Maintenance and Corrective Maintenance as described below.

D.3.1: Preventive Maintenance

- a) The Preventive Maintenance shall consist of:

Routine maintenance of the Equipment, including but not limited to the testing of functions and inspecting of the condition of the Equipment in order to keep the Equipment safe for use and in Good Working Order; and

Adjustment and/or repair of any defect in or malfunction of the Equipment discovered by the Contractor's representatives during the course of routine maintenance checks.

- b) The Preventive Maintenance performed shall be in compliance with the maintenance procedures and safety tests specified by the manufacturer.
- c) The Preventive Maintenance shall be carried out during Operating Hours.

- d) The contractor shall give the Authority a minimum of three (3) days' notice before carrying out the Preventive Maintenance at the Authority's premises.

D.3.2: Corrective Maintenance

- a) Upon receipt of oral or written notice from the Authority, the Contractor shall use its best endeavours to ensure that the Contractor's suitably qualified and duly authorised representatives attends to the Authority, within the response time of not more than forty-eight (48) hours upon receipt of oral/written notification if the request is made on a Working Day. If the request is made on a non-Working Day, the Contractor shall respond within the first forty-eight (48) hours of the beginning of the next Working Day.
- b) The Contractor shall attend to unlimited breakdown calls. For this purpose, the Contractor shall provide the Company with a telephone number through which requests for Corrective Maintenance can be made by the Authority.
- c) The Contractor shall complete any repair, or replacement or adjustment of components within one (1) week from and including the date on which the Contractor was given notice pursuant to Clause D.3.2 (a), unless the Authority had agreed in writing to have the time period extended.

D.3.3: Replacement and Purchase of Components

- a) Contractor shall inform the Authority of any part or component of the Equipment that needs to be replaced. Prior written approval must be issued by the Authority before the replacement may be effected unless the replacement required is deemed urgent by the Authority in which case a verbal approval (which shall subsequently be confirmed in writing) obtained from an authorised officer of the Authority shall suffice.
- b) The Contractor shall use all reasonable endeavours to supply only original or genuine replacement components, which are required to maintain the Equipment in Good Working Order.
- c) Where the Contractor fails to repair the Equipment within a reasonable period of time, the Authority shall be entitled to engage a third-party service provider to repair the Equipment and any additional cost incurred by the Authority shall be on the account of the Contractor.

PART 3: REQUIREMENT SPECIFICATIONS**HSA000ETT18300055****Equipment 2:** Online Automated Extraction and Sample Injection System**Location:** Analytical Toxicology Laboratory, Drug Abuse Testing**Quantity:** 1

I hereby confirm that I can meet all the Requirement Specifications as stated above.

Supplier's (as *Principal/Agent)
Company or Business Registration No:

Supplier's official
Stamp:

Authorized Signature

Name:

Designation:

(*Delete whichever is not applicable)

Please indicate any non-compliance here should there be any.

Reference To	<u>Remarks</u>