



EUROPEAN COMMISSION  
JOINT RESEARCH CENTRE

Directorate F - Health, Consumers & Reference Materials  
**Unit F.5 - Food & Feed Compliance**

## CALL FOR TENDERS JRC/GEE/2019/OP/1859

Supply, installation, training and maintenance of  
an Ultra High Performance Liquid Chromatography (UPLC) system  
coupled to a Quadrupole Tandem Mass Spectrometer

Tender specifications:  
Part 2 – Technical Specifications

|                          |
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## **1. INTRODUCTION**

JRC-Geel (Belgium) is one of the six scientific sites of the European Commission's Joint Research Centre (JRC).

As the European Commission's scientific service, the JRC addresses key societal challenges, providing EU policy makers with independent, evidence-based scientific and technical support required for EU policy making.

JRC-Geel has a proud history of more than 55 years of scientific research and brings together multi-disciplinary expertise for developing new measurement methods and tools such as reference materials, promoting standardisation and harmonisation across the European Union to stimulate innovation and to protect consumers and citizens.

JRC-Geel employs about 250 individuals who work on biotechnology, food and feed safety, food fraud detection, healthcare, nanotechnology, nuclear safety and security, and threat detection. These activities are conducted in state-of-the-art laboratories and facilities.

More information can be found on our website: <https://ec.europa.eu/jrc/en>.

## **2. DEFINING OF THE MARKET**

This procurement procedure concerns the supply, installation, training and maintenance of an Ultra High Performance Liquid Chromatography system (UPLC) coupled to a Quadrupole Tandem Mass Spectrometer for the qualitative and quantitative analysis of mainly small molecules, to be used in the frame of the operation of the European Union Reference Laboratory for Feed Additives (Control), (EURL-FA Control).

## **3. SUBJECT OF THE TENDER**

JRC-Geel intends to set up a contract for the supply, installation, training and maintenance of an Ultra High Performance Liquid Chromatography system (UPLC) coupled to a Quadrupole Tandem Mass Spectrometer (UPLC-MS/MS) for the EURL-FA Control, hosted in the 'Food and Feed Compliance' unit.

The planned instrumentation is foreseen to replace an existing configuration used to execute the work programme of the EURL-FA Control. In particular, the instrument will be used for the qualitative and quantitative analysis of mainly small molecules. Feed additives are from very diverse chemical and biological nature and UPLC-MS/MS constitutes a technique of choice for the identification and quantification of many of them that are relevant for the control monitoring plan of the EU Member States.

All necessary accessories and options for the proper operation of the complete instrumentation must be provided, including the appropriate hardware and software. The equipment must include software for the evaluation of chromatograms and mass spectra. A comprehensive database, which can be used for the identification of compounds by comparing acquired mass spectra to standards spectra in the database shell, needs to be part of the system.

The instrument must be integrated to the existing Feed Control laboratory hence it would be an asset if the software is capable of handling data acquired on other workstations/instruments in an easy and effective way (see award criteria in the Administrative Annex point 2.5.1).

The contract shall include delivery, assembling, and installation of the equipment as well as training of JRC-Geel personnel. A warranty period of at least 24 months after delivery and acceptance of the requested equipment needs to be granted.

#### 4. MANDATORY TECHNICAL REQUIREMENTS

*Evidence that the proposed instrument/service meets the mandatory requirements mentioned below, must be added to the tender documents.*

At least the following instrumental and operational features must be guaranteed:

##### 4.1. UPLC (ULTRA-HIGH PERFORMANCE LIQUID CHROMATOGRAPHY)

| Mandatory technical requirements  | Compliance check         | Page in your offer (if applicable) |
|---|--------------------------|------------------------------------|
| <b>1. General</b>   |                          |                                    |
| On-line coupling with the triple quadrupole MS/MS system must be possible according to the specifications listed in 4.2.  | <input type="checkbox"/> |                                    |
| The UPLC system is fully controlled by the triple quadrupole MS/MS software or integrated within.   | <input type="checkbox"/> |                                    |
| All UPLC parts that need regularly maintenance shall be accessible from the front side of the instrument.   | <input type="checkbox"/> |                                    |
| <b>2. Auto sampler</b>  |                          |                                    |
| The auto sampler must be able to hold at least 200 standard 1.5 mL vials and have the capacity of holding other sample containers (e.g. well-plates or small capacity vials).   | <input type="checkbox"/> |                                    |
| The auto sampler shall be temperature controlled and covering a temperature range from at least 4.0°C to 40.0°C with a precision on the temperature control of minimum 1°C and limited condensation on the sample containers. | <input type="checkbox"/> |                                    |
| The auto sampler carry-over must be less than 0.05% (e.g. a standard in neat solution). This can be shown by UV detection or MS detection.  | <input type="checkbox"/> |                                    |
| The system must allow injection volume ranging from at least 0.5 µL to at least 20 µL (0.1 µL increments).  | <input type="checkbox"/> |                                    |
| The auto sampler injection precision must be better than 0.5 % RSD at 5 µL.   | <input type="checkbox"/> |                                    |
| The auto sampler must not let light into the compartment from outside.  | <input type="checkbox"/> |                                    |
| The auto sampler manager must be controlled from an integrated software package together with the other LC parts and the mass spectrometer.   | <input type="checkbox"/> |                                    |
| <b>3. Pump</b>  |                          |                                    |
| The pump for solvent delivery must be a binary pump allowing an upper operating pressure of at least 1000 bars permitting optimum separations on small (low-micron) particles columns.  | <input type="checkbox"/> |                                    |
| The pump must have an integrated degasser operating on each solvent channel.  | <input type="checkbox"/> |                                    |
| The pump must be able to deliver solvent enabling linear and non-linear gradient profile as well as stable isocratic elution.   | <input type="checkbox"/> |                                    |
| The flow rate must be from 1 µL/min to at least 1000 µL/min with 1 µL/min increments.   | <input type="checkbox"/> |                                    |
| Flow accuracy must be less than ±1% at 1 – 20 µL/min using 100% solvent A. The pump flow precision must be less than 0.075% RSD.  | <input type="checkbox"/> |                                    |
| The compositional accuracy must be ±1% at a flow rate of 500 µL/min with a pressure resolution of at least 0.01 bar.  | <input type="checkbox"/> |                                    |
| The binary pump solvent composition delivered must be   | <input type="checkbox"/> |                                    |

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| programmable to 0.0 – 100.0% in 0.1% increments.   |                          |  |
| The reproducibility of the composition of the gradient must be better than 0.5 SD on 5 injections.   | <input type="checkbox"/> |  |
| The pump manager must be controlled from an integrated software package together with the other LC parts and the mass spectrometer.  | <input type="checkbox"/> |  |
| <b>4. Column compartment</b>   |                          |  |
| The module must include a temperature controlled chamber/compartment for the column(s) with temperature control ranging from 5°C to 65°C (at least 1°C increments). The compartment must be located at adequate distance to the source of the mass spectrometer in order to limit the temperature loss after chromatographic separation. | <input type="checkbox"/> |  |
| Precision of temperature control: minimum $\pm 0.5^{\circ}\text{C}$  | <input type="checkbox"/> |  |
| The column heater compartment must support one or more column(s), from 1.0 mm to 4.6 mm ID to up to at least 150 mm in length, with a pre-filter or guard column.  | <input type="checkbox"/> |  |
| The column compartment manager must be controlled from an integrated software package together with the other LC parts and the mass spectrometer.  | <input type="checkbox"/> |  |
| <b>5. Photo Diode Array Detector</b>   |                          |  |
| Wavelength range: 190 to at least 800 nm at 1 nm increments.   | <input type="checkbox"/> |  |
| Wavelength accuracy: at least $\pm 1$ nm at 254 nm and 640 nm.   | <input type="checkbox"/> |  |
| Drift: < 1mAU/hr after warm up.  | <input type="checkbox"/> |  |
| Cell pressure range: up to at least 65 bars.   | <input type="checkbox"/> |  |
| Cell dimension: 50 mm, 10 $\mu\text{L}$ Light Pipe flow cell, alternatively a smaller flow cell of maximum 2 $\mu\text{L}$ shall be available.   | <input type="checkbox"/> |  |
| Integrated system for validation of wavelength accuracy.   | <input type="checkbox"/> |  |
| At least three wavelength selectable channels shall be available.  | <input type="checkbox"/> |  |
| Light sources: deuterium and tungsten lamp.  | <input type="checkbox"/> |  |
| Scan rate: user selectable, up to 20 Hz.   | <input type="checkbox"/> |  |
| It must be easy to couple the photo diode array detector with the mass spectrometer defined in 4.2.  | <input type="checkbox"/> |  |
| The photo diode array detector must be controlled from an integrated software package together with the other LC parts and the mass spectrometer.  | <input type="checkbox"/> |  |

#### 4.2. TRIPLE QUADRUPOLE MASS SPECTROMETER

| Mandatory minimum technical requirements   | Compliance check         | Page in your offer (if applicable) |
|--|--------------------------|------------------------------------|
| <b>1. Ion source</b>   |                          |                                    |
| The instrument must be equipped with an atmospheric pressure ionisation (API) LC interface that includes the source and spraying units. Samples may be introduced by direct infusion in solution, or the system may be interfaced directly to the UPLC system. | <input type="checkbox"/> |                                    |
| The ion source must be of a proven API source technology design. It must allow efficient discrimination of analytes from interferents and protect the analyser against “dirty” samples.  | <input type="checkbox"/> |                                    |
| Positive and negative ionisation capabilities must be included as standard on the instrument.  | <input type="checkbox"/> |                                    |
| The API source must have flat tuning and must have ion-  | <input type="checkbox"/> |                                    |

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| optics that enable automated tuning.  |                          |  |
| The API source must have a tube lens with mass-dependent potential for focusing ions in the free jet expansion region of the source.  | <input type="checkbox"/> |  |
| The API source tube lens must have selectable offset voltage to balance desolvation and fragmentation in order to maximize sensitivity.   | <input type="checkbox"/> |  |
| The API source must have an automatic tuning program that optimizes all ion focusing voltages.  | <input type="checkbox"/> |  |
| The API source must incorporate a safety interlock switch to shut off voltages when probe is removed from source housing.   | <input type="checkbox"/> |  |
| The API control must include high-voltage dual-polarity power supply, if applicable, sheath gas pressure control, and auxiliary gas flow control to accommodate a wide variety of applications.   | <input type="checkbox"/> |  |
| Must include an independently heated ion tube, heated by an external heater capable of temperatures up to 450°C.  | <input type="checkbox"/> |  |
| A vent free access to the source must be possible. Easy access to the source for maintenance and cleaning must be possible without breaking instrument vacuum, maximising instrument up time.   | <input type="checkbox"/> |  |
| The ion tube and the skimmer must be off-axis to one another for improved signal-to-noise.  | <input type="checkbox"/> |  |
| All voltages for focusing the ion beam in the API source must be controlled through the data system.  | <input type="checkbox"/> |  |
| Must include a removable cone.  | <input type="checkbox"/> |  |
| Must support optional interchangeable ionisation sources, e.g.: off-Axis ESI source, off-Axis APCI source, off-Axis APPI source.  | <input type="checkbox"/> |  |
| The ion source must be able to use Zero Grade Nitrogen (standard lab grade) for the desolvation and cone gas  | <input type="checkbox"/> |  |
| The ion guide between the source and analyser must support rapid, axial transport of ions through the device, enabling use of high performance rapid chromatographic separations and acquisition in MS and MS/MS modes.   | <input type="checkbox"/> |  |
| The LC inlet probe position must be optimised in order to reduce the risk of chromatographic peak broadening.   | <input type="checkbox"/> |  |
| The desolvation and cone gas must be supplied via controlled mass flow meters and be controlled via the data system. The desolvation temperature must be sufficient for small molecules such as antibiotics, vitamins and pro-vitamins (non-exhaustive list).           | <input type="checkbox"/> |  |
| All source voltages must be under data system control and must incorporate active readbacks.  | <input type="checkbox"/> |  |
| <b>2. Ionization probes</b>   |                          |  |
| Electrospray (ESI) must be provided as standard with the instrument. The ESI incorporates a heated gas (nitrogen) flow for most efficient desolvation. The ESI must operate at flow rates between 1 µL/min and at least 600 µL/min using 100 % water without splitting. | <input type="checkbox"/> |  |
| The ESI probe must include an electrically-isolated electrospray needle capable of voltage-regulated operation up to ± 8 kV at 100 µamps discharge current.   | <input type="checkbox"/> |  |
| The ESI probe needle must be moveable in the x and z dimensions relative to the sampling orifice for optimal tuning.  | <input type="checkbox"/> |  |
| Ion source voltages, gas flows and heating elements must be fully tuneable and controlled from an integrated  | <input type="checkbox"/> |  |

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| software package together with the other LC parts and the mass spectrometer.  |                          |  |
| <b>3. Triple Stage Quadrupole Mass Spectrometer</b>   |                          |  |
| The instrument must incorporate a high performance tandem quadrupole mass analyser with inter-element beam focusing.  | <input type="checkbox"/> |  |
| The Quadrupoles must have a large field radius for high transmission and superior peak shape.   | <input type="checkbox"/> |  |
| The resolving quadrupoles must be fitted with quadrupole pre-filters to maximise resolution and transmission and also to protect the resolving quadrupoles from contamination.  | <input type="checkbox"/> |  |
| The mass spectrometer must have automatic system calibration and optimization.  | <input type="checkbox"/> |  |
| Mass-to-charge ratio range: 5 to at least 3000 amu.   | <input type="checkbox"/> |  |
| The instrument must be capable of high resolution precursor ion selection of less than or equal to 0.4 Dalton.  | <input type="checkbox"/> |  |
| The instrument allows the use of an isolation window of $\leq 0.7$ Da.  | <input type="checkbox"/> |  |
| The triple quadrupole mass spectrometer must allow a speed of analysis of at least 400 SRM transitions per second.  | <input type="checkbox"/> |  |
| The instrument must have ion polarity switching in less than 0.5 seconds.   | <input type="checkbox"/> |  |
| All lenses and analyser voltages must be digitally controlled.  | <input type="checkbox"/> |  |
| The collision cell must be designed in a way that avoids uncharged species to reach the third quadrupole.   | <input type="checkbox"/> |  |
| There must be no cross talk at dwell times equal or larger than 10 ms.  | <input type="checkbox"/> |  |
| The gas applied for the collision should be indicated.  | <input type="checkbox"/> |  |
| Collision gas pressures and flows used during data acquisition must be automatically appended to the relevant data file.  | <input type="checkbox"/> |  |
| The instrument must have software control and automated optimization of collision energy and gas pressure. The control must be from an integrated software package together with the other LC parts and other components of the complete instrument system. | <input type="checkbox"/> |  |
| <b>4. Vacuum System</b>   |                          |  |
| The instrument must incorporate a clean differentially pumped, automated vacuum system.   | <input type="checkbox"/> |  |
| The mass spectrometer must have no more than two roughing pumps.  | <input type="checkbox"/> |  |
| The mass spectrometer must have air-cooled turbomolecular pump(s).  | <input type="checkbox"/> |  |
| If an oil-based rotary pump is suggested for backing off the turbo pumps, a noise reducing cabinet must be provided. The maximum distance between the pump and the instrument must also be indicated.   | <input type="checkbox"/> |  |
| The mass spectrometer must have a differentially-pumped vacuum system with pressures ranging from atmospheric pressure to $10^{-6}$ Torr.   | <input type="checkbox"/> |  |
| A Pirani gauge must be fitted to the collision cell for gas pressure monitoring.  | <input type="checkbox"/> |  |
| A Penning gauge must be fitted to the analyser to monitor the vacuum.   | <input type="checkbox"/> |  |
| The vacuum system must be controlled from an integrated   | <input type="checkbox"/> |  |

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| software package together with the other LC parts and the mass spectrometer.   |                          |  |
| <b>5. Detector</b>   |                          |  |
| Maximum elimination of neutral noise must be provided and the detection system must have digital electronic noise discrimination.  | <input type="checkbox"/> |  |
| The detector must be enclosed in its own vacuum envelope or similar protection for long life.  | <input type="checkbox"/> |  |
| The detection system must be capable of detecting both positive and negative ions and of switching polarity rapidly (less than 30 ms) under digital control.   | <input type="checkbox"/> |  |
| Linear dynamic range of peak areas must be better than 3 orders of magnitude when monitoring the most abundant ion while maintaining mass accuracy of 1 ppm using internal standard.                                 | <input type="checkbox"/> |  |
| Mass measurement accuracy must be better than 5 ppm in routine operation using an external calibration and better than 1 ppm when using an internal standard.  | <input type="checkbox"/> |  |
| Mass resolution of MS2 must be greater than 20,000 FWHM when acquiring a minimum of 25 scans per second.   | <input type="checkbox"/> |  |
| Scan speed in product ion scanning mode must be better than 25 scans per second.   | <input type="checkbox"/> |  |
| The detector must be controlled from an integrated software package together with the other LC parts and the mass spectrometer.  | <input type="checkbox"/> |  |
| <b>6. Additional hardware features</b>   |                          |  |
| The system must include an electronically controllable integrated divert valve, accessible from the front panel.   | <input type="checkbox"/> |  |
| The divert valve must be under fully automated data system control. The control must be from an integrated software package together with the other LC parts and other components of the complete instrument system. | <input type="checkbox"/> |  |
| The divert valve must enable the user to switch the solvent front, gradient end point and any other portion of the HPLC run to waste.  | <input type="checkbox"/> |  |
| Allow user to define the default state of the valve "to waste" or "to source".   | <input type="checkbox"/> |  |
| An infusion device must be integral to the instrument and must be controllable from the instrument software.   | <input type="checkbox"/> |  |
| The system must include an integrated syringe pump.  | <input type="checkbox"/> |  |
| The mass spectrometer must have total syringe pump control to allow for automated infusion under data system control.  | <input type="checkbox"/> |  |
| The data system must be capable of switching the syringe pump on and off in segments.  | <input type="checkbox"/> |  |
| The syringe pump must be able to work together with the divert valve to perform automated loop injections to optimize the instrument.  | <input type="checkbox"/> |  |
| <b>7. Instrument control and data processing (minimum configuration)</b>   |                          |  |
| The instrument must be supplied with a PC fulfilling all requirements to operate the instrument, including two flat high resolution screens of at least 19" and a keyboard (UK English version).                     | <input type="checkbox"/> |  |
| The PC must be configured with a Microsoft Windows operating system, minimum Windows 7 and anti-virus software.  | <input type="checkbox"/> |  |



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| Minimum 16 GB of RAM.   | <input type="checkbox"/> |  |
| Two hard discs of which one is for data storage of minimum 1 TB.  | <input type="checkbox"/> |  |
| DVD-R/DVD-RW drive.   | <input type="checkbox"/> |  |
| DVI-Add in card.  | <input type="checkbox"/> |  |
| 2 Network cards (it must be possible to connect the PC to the local network).   | <input type="checkbox"/> |  |
| At least 32Mb ATI Radeon AGP Graphics card with TV-out and DVI, or equivalent.  | <input type="checkbox"/> |  |
| At least 2 USB (at least 2.0) ports.  | <input type="checkbox"/> |  |
| Button optical mouse.   | <input type="checkbox"/> |  |
| Combined package controlling mass spectrometry instrumentation and chromatography system in a fully integrated software system.   | <input type="checkbox"/> |  |
| Software for data processing including deconvolution options must be included.  | <input type="checkbox"/> |  |
| All user software must be in UK English version.  | <input type="checkbox"/> |  |
| <i><u>Note:</u> Remote access to the PC is not permitted; all software must be tested at the time of installation.</i>  |                          |  |
| It should be specified if the software can be run from a user account without administrative rights.  | <input type="checkbox"/> |  |
| The software must be able to fully control the UPLC-MS/MS system, but also the UPLC as a stand-alone system.  | <input type="checkbox"/> |  |
| The system must have the ability to handle both single samples and batches of samples; the amount of samples that can be accepted by the system will depend on the type of autosampler that is configured with the instrument.  | <input type="checkbox"/> |  |
| The software must allow sequential user logon. Each user must have an individual username so that data that is processed can be clearly identified.   | <input type="checkbox"/> |  |
| The software must include features that allow the user to define actions that have to be performed by the instrument in case of any error message.  | <input type="checkbox"/> |  |
| There must be a feature for easy designing of reports and report templates.   | <input type="checkbox"/> |  |
| Data must be acquired automatically and then processed under user specified parameters to produce a report. The report must be both viewable in a browser format and be printed as a hardcopy. Electronic report output formats should include xls, doc, html, pdf or similar.  | <input type="checkbox"/> |  |
| There must be a feature that allows defining at least 3 Qualifier Ions for each analyte and that supports ion ratio confirmation for all Target/Qualifier Ion combinations. It must be possible to set peak detection parameters for each Qualifier Ion independently. Ion ratios that are out of specifications must be indicated. | <input type="checkbox"/> |  |
| There must be a feature that enables to select data and formats to be exported directly into MS Excel.  | <input type="checkbox"/> |  |
| The software must include a feature that enables the creation of own mass spectral databases and later on allows to compare spectra of unknown compounds with spectra in the database.  | <input type="checkbox"/> |  |
| The software must include a feature that facilitates instrument tuning by optimizing the sensitivity of the instrument for preselected m/z values.  | <input type="checkbox"/> |  |

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| The system must provide on-line diagnostic help with remote system diagnosis possible by service engineers.  | <input type="checkbox"/> |  |
| The mass spectrometer instrument set up must allow programmatic separation into scan segments and scan event with a graphical user interface.  | <input type="checkbox"/> |  |
| It must be possible to acquire and display Full Scan mass spectra from Q1 and Q3.  | <input type="checkbox"/> |  |
| It must be possible to acquire and display Full Scan Product ion spectra.  | <input type="checkbox"/> |  |
| It must be possible to acquire spectral data by MS selected ion recording/monitoring (SIR / SIM).  | <input type="checkbox"/> |  |
| It must be possible to acquire spectral data by MS/MS precursor ion scanning (parent).   | <input type="checkbox"/> |  |
| It must be possible to acquire spectral data by MS/MS product ion scanning (daughter).   | <input type="checkbox"/> |  |
| It must be possible to acquire spectral data by MS/MS multiple reaction monitoring (MRM).  | <input type="checkbox"/> |  |
| <b>Advanced Scan Functions:</b>  |                          |  |
| The instrument must be able to acquire a data-dependent scan based upon all kinds of scanning preceding survey scans. It must also be able to switch ion polarity of the data-dependent scan.      | <input type="checkbox"/> |  |
| Must be able to perform selective ion monitoring on at least 25 ions.  | <input type="checkbox"/> |  |
| Must have an appropriate feature that allows to automatically select lock masses for accurate mass experiments.  | <input type="checkbox"/> |  |
| Must have capability to temporarily exclude an ion while allowing acquisition of MS/MS spectra; increases the selectivity of co-eluting compounds, and enhances the signal of a selected compound. | <input type="checkbox"/> |  |
| Must have Isotopic scan capability to automatically perform MS/MS when a user-defined isotopic pattern is detected.  | <input type="checkbox"/> |  |
| The application manager must support fully automated instrument shut down and start up.  | <input type="checkbox"/> |  |

#### 4.3. CONSUMABLES/ SPARE PARTS TO BE SUPPLIED WITH THE INSTRUMENT

| Mandatory technical requirements   | Compliance check         | Page in your offer (if applicable) |
|--|--------------------------|------------------------------------|
| <b><i>The following –or equivalent- must be supplied:</i></b>  |                          |                                    |
| <p>All consumables (if applicable) needed to perform basic maintenance operation by the user has to be provided with the instrument. This has to cover items such as (if applicable):</p> <ul style="list-style-type: none"> <li>• UPLC: replacement tubing, at least 10 inline filters for HPLC solvents, 3 replacement syringes (or equivalent) for the auto sampler, a set of screws and ferrules (or equivalent) to connect columns (resistant to the maximum operation pressure of the instrument), a replacement sample loop, 1 replacement for the deuterium as well as tungsten lamp.</li> <li>• MS: At least 10 replacement capillaries for the electrospray interface, at least 10 replacement capillaries for the APCI interface (if purchased), at least 3 sets of replacement cones.</li> </ul> <p>These examples do not constitute an exhaustive list.</p> | <input type="checkbox"/> |                                    |

#### 4.4. INSTALLATION, TRAINING AND OTHER SERVICES

| Mandatory technical requirements   | Compliance check         | Page in your offer (if applicable) |
|--|--------------------------|------------------------------------|
| <b>1. Delivery and installation</b>  |                          |                                    |
| The contractor shall ensure that any potential hazards and precautions associated with the instrument (and its sub-devices) with respect to safety, health and environment are fully explained. The contractor shall provide the JRC-Geel technical responsible with the detailed installation requirements (in written form) at least 2 months before the foreseen installation date. | <input type="checkbox"/> |                                    |
| The contractor shall carry out instrumental functionality tests before the instrument modules are shipped.   | <input type="checkbox"/> |                                    |
| The pre-shipping and post shipping on-site tests must be the same for comparison purposes and according to the manufactory's specifications. The contractor shall document all test results and provide the report issued.   | <input type="checkbox"/> |                                    |
| Delivery and installation of the equipment within 3 months after signature of the Contract.  | <input type="checkbox"/> |                                    |
| The installation must be performed by (a) qualified engineer(s).   | <input type="checkbox"/> |                                    |
| The supplier shall provide system manuals at least in English.   | <input type="checkbox"/> |                                    |
| <b>2. Training</b>   |                          |                                    |
| <i>The training sessions have to be arranged by mutual agreement between the trainer and the technical responsible.</i>  |                          |                                    |
| The training must be given by (a) qualified trainer(s)/application specialist(s).  | <input type="checkbox"/> |                                    |
| The training has to be given in the English language.  | <input type="checkbox"/> |                                    |
| All training supporting documents should be in English.  | <input type="checkbox"/> |                                    |
| A description of the training has to be included in the offer.   | <input type="checkbox"/> |                                    |
| <b>2.1. Basic Training:</b>  |                          |                                    |
| The contractor shall provide at least 3 days on-site training, after and separate to installation of the instrument for 3-5 JRC-Geel staff members. If necessary, it must be possible to split up the training in training sessions of at least half a day each.   | <input type="checkbox"/> |                                    |
| The training has to cover basic instrument maintenance, including operation qualification and troubleshooting as well as basic and advanced operation and software features. Other features to be covered are the development of new methods and carrying out analysis, including QC aspects.  | <input type="checkbox"/> |                                    |
| <b>2.2. Advanced application training:</b>   |                          |                                    |
| The contractor shall provide 3-5 days of training for 3-5 JRC-Geel staff members at the JRC-Geel site after a short period of hands-on experience.   | <input type="checkbox"/> |                                    |

#### 4.5. GUARANTEE AND TECHNICAL SUPPORT

| Mandatory technical requirements  | Compliance check         | Page in your offer (if applicable) |
|---|--------------------------|------------------------------------|
| <b>1. Guarantee</b>   |                          |                                    |
| A guarantee period of 24 months (all-inclusive plan) after the installation is required. This will include all components of the LC-MS hardware and all software components including all data processing software, starting after delivery and acceptance of the requested | <input type="checkbox"/> |                                    |

|   |                          |  |
|---|--------------------------|--|
| equipment and training by the signature of the Certificate of Conformity by the contracting authority. This also includes all software releases and updates during the 24 months period.  |                          |  |
| <b>2. Technical Support</b>   |                          |  |
| Guarantee must foresee rapid on-site interventions when required (within three working days). Any component or part that is proven to be defective during the guarantee period must be repaired and/or replaced by the contractor, free of charge and within three working days. A corrective maintenance intervention has to be provided upon request (phone call confirmed by email). | <input type="checkbox"/> |  |
| During the guarantee period technical support (free of charge) in English must be available by telephone and/or e-mail from Monday until Friday between 09:00 hours and 16.00 hours (except bank holidays).   | <input type="checkbox"/> |  |

#### 4.6. PREVENTIVE MAINTENANCE

| Mandatory technical requirements   | Compliance check         | Page in your offer (if applicable) |
|--|--------------------------|------------------------------------|
| The contract must cover preventive maintenance during the 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , 6 <sup>th</sup> , 7 <sup>th</sup> and 8 <sup>th</sup> year after installation. On each occasion of preventive maintenance, for the duration of the contract, operation qualification tests must be made, all software updates required and a report provided.  | <input type="checkbox"/> |                                    |
| As preventive maintenance is understood a periodic intervention on the working instrument to ensure its proper functioning. The contractor must provide preventive maintenance according to the periodicity defined by the manufacturer(s) and the manual(s) of the parts and components, but at least once within every 12 months.  | <input type="checkbox"/> |                                    |
| Preventive maintenance service and operation qualification must also take place during the guarantee period <sup>(1)</sup> if required by the manufacturer to ensure the guarantee.  | <input type="checkbox"/> |                                    |
| The preventive maintenance shall take place on the initiative of the contractor at a date and time agreed with the JRC-Geel technical responsible as referred to in the Contract.  | <input type="checkbox"/> |                                    |
| The preventive maintenance shall be all inclusive, covering all related costs like: <ul style="list-style-type: none"> <li>• Travel and subsistence expenses;</li> <li>• Labour;</li> <li>• Control of the equipment's performance (inspection, maintenance, calibration and operational qualification of key equipment);</li> <li>• Consumables;</li> <li>• Spare parts necessary to the execution of the intervention;</li> <li>• ...</li> </ul> | <input type="checkbox"/> |                                    |
| Possible corrective maintenance after the guarantee period will not be part of this contract. If required, it will be ordered separately.  | <input type="checkbox"/> |                                    |
| At the end of each intervention, both for the preventive and (possible) corrective maintenance, a maintenance report (Annex IV to the contract or equivalent) will be produced, signed by the contractor and countersigned by the JRC-Geel responsible for approval. This report must  | <input type="checkbox"/> |                                    |

|   |  |  |
|---|--|--|
| indicate the number of the contract, the work performed, the time spent and include a detailed account of the defects found and the parts replaced. |  |  |
|---|--|--|

<sup>(1)</sup> The price of preventive maintenance during the guarantee period must be included in the total price of Phase 1 (see contract art. I.4)

#### 4.7. OPTIONS

Options are qualitative or quantitative extras, ancillary to the main purchase, and which are optional for JRC-Geel - it has the right to buy them or not - but not to the tenderers, who have to include them in their technical and financial tender.

JRC-Geel can order these options at contract signature:

| Minimum technical requirements  | Compliance check         | Page in your offer (if applicable) |
|---|--------------------------|------------------------------------|
| <b>APCI ion source:</b> An APCI ion source or a combined APPI (atmospheric pressure photo ionisation)/APCI must be available:   | <input type="checkbox"/> |                                    |
| <ul style="list-style-type: none"> <li>The APCI must operate at flow rates from 50 µL/min and at least 1 mL/min using 100% water without splitting.</li> </ul>  | <input type="checkbox"/> |                                    |
| <ul style="list-style-type: none"> <li>The APCI source must include a feedback-controlled heater capable of operation up to 600 °C to vaporize the solvent and analyte.</li> </ul>                                  | <input type="checkbox"/> |                                    |
| <ul style="list-style-type: none"> <li>The APCI source must provide stable current-regulated operation up to 100 µamps discharge current and 8 kV applied voltage in the positive and negative ion mode.</li> </ul> | <input type="checkbox"/> |                                    |
| <ul style="list-style-type: none"> <li>The APCI sample nozzle must be moveable in the x and z dimensions relative to the sampling orifice for optimal tuning.</li> </ul>  | <input type="checkbox"/> |                                    |
| <ul style="list-style-type: none"> <li>All probes must be easily interchangeable, without breaking the vacuum.</li> </ul>   | <input type="checkbox"/> |                                    |

#### 5. ACCEPTANCE OF THIS CALL FOR TENDERS

Submission of a tender implies acceptance by the tenderer of the terms and conditions specified in this invitation to tender, in the terms of reference and in the draft contract and, where appropriate, waiver of the tenderer's own general or specific terms and conditions. The tenderer assures that he has proved the completeness of the content of this tender and that it is neither incomplete nor ambiguous.

The tender should be submitted and the contract executed in accordance with the laws and regulations applicable. By signing this document, the successful tenderer agrees to be bound thereby during implementation of the contract.

.....

Place

Date

.....

The tenderer  
(Stamp and signature)