

## **ANNEX A: TECHNICAL SPECIFICATIONS OF ICP-MS**

### **1 GENERAL REQUIREMENTS**

The supplier must deliver a complete working system consisting of an ICP-MS with autosampler as specified in chapter 1.3. The system will primarily be used for quantitative identification of elements in a range of different matrices. However, it will also be used for qualitative purposes in order to screen for the presence of selected elements.

All Tenderers should complete and return the attached verification table given in Annex D. Some places only a confirmation is required. If a longer description or drawings are asked for, refer to an attachment. Each question is labeled. The answers will be used in the evaluation process. Please include an electronic version (in Word-format) of the verification matrix (on CD-R or similar) in the Tender documents.

### **2 DETAILED REQUIREMENTS**

#### **A Safety Devices**

- A.1 Specify the need for devices against power failure (UPS)
- A.2 Protective devices against water failure must be included, if recommended

#### **B Installation and dimensions**

- B.1 Specify the dimensions and weight of the instrument, with and without autosampler
- B.2 Specify the voltage range, stability, accuracy, power consumption and power connections (single- or three-phase)
- B.3 Specify the requirements of the instrument room such as size, temperature and ventilation
- B.4 Specify necessary exhaust venting from the instrument as well as the vacuum pump if needed. Indicate if there is a need for more than one ventilation duct connected to the vent
- B.5 Specify recommended storage capacity of argon gas
- B.6 Specify inlet pressure and flow of gases (Ar, H, He) into the instrument
- B.7 Specify recommended gas quality
- B.8 Specify positioning of the vacuum pump (e.g. if it can be placed in a certain distance from the instrument to avoid noise, such as a service room)
- B.9 The instrument shall be equipped with a recirculating water cooler unit
- B.10 The instrument shall be prepared for future installation of optional chromatographic equipment, such as LC and GC

#### **C Operating the instrument**

- C.1 Specify the noise from the instrument in operating mode
- C.2 Specify the start-up time for the instrument
- C.3 Specify the argon consumption during run
- C.4 Specify the minimum amount of sample needed for one-element analysis
- C.5 Specify highest recommended matrix load on standard instrument
- C.6 Specify highest recommended matrix load on instrument when using optional equipment for handling high matrix load
- C.7 Specify methods for elimination of interferences during run
- C.8 Specify the frequency range of the RF-generator

C.9 Specify tuning methods for torch and MS

**D Performance**

- D.1 Specify the analytical results for all samples delivered by FFI, including raw data (CPS-values)
- D.2 Detection limit for all elements listed in chapter 1.1 included the signal response in cps
- D.3 Specify the MS resolution (AMU)
- D.4 Specify the MS scan speed
- D.5 Specify detector signal stability
- D.6 Specify dynamic mass range
- D.7 Specify the time for analysis of Pb, Cu, Zn, Sb in one sample with standard and advanced autosampler
- D.8 Specify if the ICP-MS is NOT suited for analysis of certain elements or matrices

**E Vacuum system**

- E.1 Specify the vacuum systems (manufacturer), the types of vacuum pumps used, vacuum level performance, service interval and related cost
- E.2 Specify the need for noise-limiting devices for the vacuum pump
- E.3 Specify acoustic noise level
- E.4 Specify the requirement for an exhaust line
- E.5 Specify if it is possible to install the pump in an outside service area

**F Accessories, spare parts and tools**

- F.1 Specify one set of tools and spare parts, necessary for user service and daily maintenance for both the ICP-MS and the autosampler
- F.2 Specify any other accessories which are included
- F.3 Specify the possibility and requirements to connect the ICP-MS to a chromatographic system for speciation analysis (e.g. GC or LC)

**G Computer and software**

- G.1 Computer specifications: Tower,  $\geq 3$  GHz Intel Core 2 Duo or better processor, min 2 GB DDR2 SDRAM, upgradeable to 4 GB, SATA-300 raid controller, 2x500 GB SATA HD in RAID 1 for OS, MS software and acquired MS data, SATA DVD+/-RW dual layer, CD/DVD burner software, 1 NIC for instrument communication, 1 free PCI slot for fiber NIC for LAN communication, minimum 1 extra free PCI slot, No WLAN, No Bluetooth.
- G.2 Computer operating system shall be MS Windows XP Professional SP2, English version
- G.3 LCD Monitor: TFT, Min 21", 1600x1200, VGA and DVI
- G.4 Specify the number of simultaneously users on one license
- G.5 Specify costs for future upgrades of software
- G.6 Specify if there is a floating license or must hardware dongles be used

**H Training**

- H.1 It is required that the Tenderer gives a training course on the ICP-MS at FFI within short time of the installation.

- H2 Specify how a training course will be structured (time, topics, number of sessions). Is it included in the price or at extra cost?

**I Maintenance and service**

- I.1 Specify number of qualified service engineers in Europe
- I.2 Specify number of qualified service engineers in Scandinavia
- I.3 Specify service visits response time
- I.4 Specify support response time
- I.5 Specify spare parts delivery time, such as detector, torch and nebulizers
- I.6 Specify warranty
- I.7 Specify system delivery time
- I.8 Specify number of previous deliveries of offered system in Norway
- I.9 Specify number of previous deliveries of offered system in Scandinavia
- I.10 A service contract for 3-5 years for the ICP-MS, starting after the date of warranty end, must be included. The service contract shall have an option to be extended on a yearly basis after this period. For the extension, a mechanism for yearly price adjustment should be included.