**Requirement Specification an Energy Dispersive Spectroscopy (EDS) detector**

1. **Requirements**

**1.1. Description of the requirement**

 **DALO wish to acquire a new complete functioning Energy Dispersive Spectroscopy (EDS) detector to be mounted on an existing SEM instrument: Zeiss EVO LS25 (2010).**

**1.2. Description and definitions**

The requirement specification, cf. section 1.4, describes all the requirements for the acquisition and consists of six columns with the following information:

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| --- | --- |
| "#" | ID number |
| "Requirement" | Requirement description |
| "Classification" | The classification of the requirement as further described in section 1.3 |
| "DALO remarks" | Further information regarding the requirement |
| "Requirement compliance" | The tenderer's indication of compliance (YES or NO) |
| "Tender description" | Requirements regarding the tenderer's compliance description  |

**1.3. Classification**

All requirements are mandatory requirements (SHALL) and shall be fulfilled by the tenderer. If just one of the mandatory requirements is not fulfilled, the tenderer's tender will not be taken into further consideration.

**1.4. Requirement and response sheet**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Requirement** | **Classification** | **DALO remarks** | **To be filled out be the tenderer** |
| **Requirement compliance****(tick a box)** | **Tenderer's description** |
| **YES** | **NO** |
| **1** | All equipment delivered shall fit the Danish electrical system. | SHALL |  |  |  |  |
| **2** | Connections shall be for triple phase 400V, or single phase 220-240V, 50Hz. | SHALL |  |  |  |  |
| **3** | The system is to be installed on the Zeiss EVO LS25 (2010) SEM system. All equipment, including software, needed for the integration with the microscope system shall be included. | SHALL |   |  |  |  |
| **4** | The analysis system shall be of a stand-alone type and not integrated into the microscope computer. | SHALL |  |  |  |  |
| **5** | The analysis system shall be compatible with the microscope specifications. | SHALL |  |  |  |  |
| **6** | Full on-site delivery, installation and verification shall be included in the tender. | SHALL | Installation site: Danish Defence LaboratoryJonstrupvej 3003500 VærløseDenmark |  |  |  |
| **7** | The tenderer shall specify the acceptance test. The test shall demonstrate the fulfillment of the specifications in this tender. The test shall be conducted on the installed system | SHALL |  The acceptance test shall include demonstration of the detector performance specified in this tender. Furthermore the software features shall be demonstrated on the installed system |  |  |  |
| Energy Dispersive Spectroscopy system (EDS) |
| **8** | A silicon-drift-detector (SDD) shall be included | SHALL |  |  |  |  |
| **9** | The insertion and retraction of the detector on the microscope shall be motorized. | SHALL |  |  |  |  |
| **10** | The detector window shall allow detection of light elements, down to carbon (C), and withstand atmospheric pressure (1 atm). | SHALL |  |  |  |  |
| **11** | The detector window shall be opaque to light. | SHALL |  |  |  |  |
| **12** | The detector area shall be at least 80mm². | SHALL |  |  |  |  |
| **13** | The detector resolution shall be 126 eV or lower for Mn Kα. | SHALL |  |  |  |  |
| **14** | The detector resolution shall be 51eV or lower for C Kα. | SHALL |  |  |  |  |
| **15** | A computer system for data acquisition and signal processing for the analysis system shall be included in the offer | SHALL |  |  |  |  |
| **16** | The computer shall be equipped with a network card for wired connection to the network including at least one “RJ45”-connector | SHALL |  |  |  |  |
| Software |
| **17** | The tender shall include software for qualitative and full quantitative analysis for elements from Z=6 up to at least Z=92. | SHALL |  |  |  |  |
| **18** | It shall be possible to acquire X-ray line profiles and maps. | SHALL |  |  |  |  |
| **19** | It shall be possible to record, store a full spectrum at each pixel and do quantitative line profiles and maps. | SHALL |  |  |  |  |
| **20** | Pulse pile-up correction shall be possible. | SHALL |  |  |  |  |
| **21** | Software for drift correction during analysis shall be included. | SHALL |  |  |  |  |
| **22** | One extra full software license for a separate computer installation shall be included in the offer, to aid with off-line analysis. | SHALL |  |  |  |  |
| **23** | It shall be possible to collect real-time elemental maps. | SHALL |  |  |  |  |
| **24** | Software updates shall be included for the first two years.  | SHALL |  |  |  |  |
| **25** | The software solution shall make it possible to do particle size analysis, including the following:* Particle detection based on image analysis, including size determination.
* Particle classification based on chemistry, morphology or a combination of these.
* Histograms with adjustable bin sizes
 | SHALL |  |  |  |  |
| **26** | The software solution shall include a database with known metal alloys for identification purposes. | SHALL |  |  |  |  |
| Installation |
| **27** | The supplier shall, within the offered price, complete installation and start- up of the delivered system. | SHALL |  |  |  |  |
| **28** | Installation and acceptance test shall be done within six (6) weeks of delivery. | SHALL |  |  |  |  |
| Training |
| **29** | Specify the plan for on-site introduction training course for the full instrument and software for up to four (4) persons held within three (3) weeks of the passed acceptance test | SHALL |  |  |  |  |
| Documentation |
| **30** | The tenderer shall supply all relevant manuals for both software and hardware in english. | SHALL | The manuals can be supplied either electronically, in hardcopy or as a combination. |  |  |  |
| Warranty |
| **31** | The instrument shall have a warranty extending at least two (2) year starting from the date of passed acceptance test. | SHALL |  |  |  |  |