**Requirement Specification specialist Chemical Detector**

1. **General**

The Danish Defence will replace our stock of AP2Cs and therefore are looking to procure 5 EA instruments to replace these.

The procurement will be done by a national tender which only contains mandatory requirements.

When completing this requirements specification the tenderer should pay close attention to the Instructions in the Tender Conditions. Thus the tenderer is not allowed to make reservations with regard to the provisions of this requirements specification. The provisions in the requirements specification are Mandatory Requirements with respect to which the tenderer may not make reservations.

**1.1. Background and scope**

The Danish Defence is procuring Chemical Detectors in order to determine the chemical that are detected with the standard issued chemical detectors. The Chemical detectors that are in use within the Danish Defence all uses the IMS technology. The responsibility for verifying the chemical is the one of the specialists in the CBRN unit many tasks.

The Chemical detectors are used to secure that the Danish forces are able to detect Chemical War Agents (CWA) and Toxic Industrial Chemicals (TIC) when they are deployed in missions. However the Danish Defence can also be asked to conduct operations within the national boarders as a support for the first responders. Further, the Chemical Detector is used for training for operations.

Denmark is a NATO member country and is participating in NATO standardization paradigms. The Supplier should be aware that compliance with NATO standards that are relevant for the materiel covered by the Agreement is expected by DALO.

Reliability of detection, ease of use, size, and weight are key factors for the Danish Defence when using the Chemical Detector.

The Chemical Detector will function as part of the special CBRN unit’s detectors for surveying the environment for chemical threats and verifying, if detected, which chemical there have been measured. Therefore it is important that this chemical detector uses another technology than the special CBRN units other detectors

**1.2. User cases**

The Chemical detector will be used during task where the CBRN specialist shall verify the presence of a chemical. This can be during their own survey but also where they are called out to help another unit within the Danish defence. This is done by confirming the first alarm by the use of an electronic instrument that are using a technology different from the standard issued chemical detector or by a non-electronic means of verifying the alarm.

But it can also be used as the primary detector if it is assessed that it and the technology is better to fulfill the task given to the CBRN specialists.

## 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:

|  |  |
| --- | --- |
| "#" | ID number |
| "Requirement" | Requirement description |
| "Classification" | The classification of the requirement is always mandatory (M) |
| "DALO remarks" | Further information regarding the requirement |
| "Requirement compliance" | The tenderer's indication of compliance - YES |
| "Tender description" | Requirements regarding the tenderer's compliance description  |

## Definition description

Spare parts:

Spare parts are defined as all parts that are an interchangeable part that is used for the repair or replacement of failed instrument or on the accessories.

Consumables:

Consumables are defined as all items that are not repairable and will be replaced regularly because they wear out or are used through the use of the instrument or by using the accessories and items that are needed for.

Education:

There are two different courses; a user course which’s main focus is to teach the user or the Danish Defence instructor how to operate the instrument, hereunder user maintenance. The maintenance course focuses on the service, calibration and repairs on all levels of maintenance, the people participating on this course are the mechanics from the Danish Defence workshop.

Support:

The instruments the Danish Defence has from the supplier will be used and deployed both in Denmark and in all other places in the world where the Danish Defence is involved. The first line of service are our own mechanics which will service the instruments to keep them operational. However in some cases that may not be enough and the Danish Defence therefore wants to be able to call on the supplier to assist on these tasks.

Repairs:

In some cases the Danish Defence doesn’t have the possibility to repair or service the instruments and therefore DALO will ask the supplier to do this task.

Trouble Shooting:

In some cases the Danish Defence will ask the supplier to perform the logical and systematic search for the source of the problem on the instruments.

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. **Requirements**

**2.1. Requirement and response sheet**

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| --- | --- | --- | --- | --- |
| **No.** | **Requirement** | **Classification** | **DALO remarks** | **To be filled out by the tenderer** |
| **YES** | **Tenderer's description** |
| **1** | **Size**The Chemical Detector shall be handheld. | M |  |  |  |
| **2** | **Technology**The Chemical Detector shall have a different technology than the ones that are already in service in the Danish Defense.The current detectors are using the IMS technology. | M | In order to be able to verify the alarm from an instrument using the IMS technology |  |  |
| **3** | **Detection**The Chemical Detector shall be able to detect gasses in vapor and liquid state.Can be done by use of accessories. | M |  |  |  |
| **4** | **Detection**The Chemical Detector shall detect the following CWA (CWA chemical warfare agents):

|  |  |  |
| --- | --- | --- |
| **Nerve** | **Blood** | **Blister** |
| Tabun – GA, CAS 77-81-6 | Cyanbrinte – AC, CAS 74-90-8 | Lewisit – L, CAS 541-23-3 |
| Sarin – GB, CAS 107-44-8 | Chlorcyan – CK, CAS 506-77-4 | Mustard – HD, CAS 506-60-2 |
| Soman – GD, CAS 96-64-0 |   | Nitrogen mustard - HN3, CAS 555-77-1 |
| GF, CAS 329-99-7 |   |   |
| SKAL VX, CAS 50782-69-9 |   |   |

 | M |  |  |  |
| **5** | **Detection**The Chemical Detector shall be able to detect TIC. | M |  |  |  |
| **6** | **Detection**The Chemical Detectors library shall include the following substances, so they can be detected by the Chemical Detector.

|  |  |  |
| --- | --- | --- |
| Acrylonitrile, CAS 107-13-1 | Isopropanol/isopropyl amine (precursor OPA) | Agent CR, CAS 0257-07-08 |
| Ammonia, CAS 7664-41-7 | Mustard/lewisite mixtures HL | VXr, CAS 159939-87-4 |
| Arsine, CAS 7784-42-1 | Runcol (agent HT), CAS 505-60-2 | Nitric Acid, CAS 7697-37-2 |
| Cyanogen Chloride | Hydrogen Sulfide, CAS 7783-06-4 | Nitrogen Dioxide, CAS 10102-44-0 |
| Dimethylamine, CAS 124-40-3 | Methylamine (mono) , CAS 74-89-5 | Parathion, CAS 56-38-2 |
| Agent Vx  | Methyl Hydrazine, CAS 60-34-4 | Phosphorous Trichloride, CAS 7719-12-2 |
| Methylphosphonyldifluorid(precursor DF) , CAS 676-99-3 | Methyl Isocyanate, CAS 624-83-9 | Sulfur Dioxide, CAS 7446-09-5 |
| EDMP (precursor QL) | Thiodiglycol, CAS 111-48-8 | Sulfur Trioxide, CAS 7446-11-9 |
| Adamsite DM, CAS 578-94-9 | Chloropicrin, CAS 1976-06-02 | Sulfuric Acid, CAS 7664-93-9 |

 | M |  |  |  |
| **7** | **Detection**The Chemical Detector shall detect all substances without the need for user actions, e.g. switching between libraries, menus, functions and ‘detection mode’ or similar.  | M |  |  |  |
| **8** | **Detection**The Chemical Detectors shall include all of the following decontaminants used by the Danish Defence, so they can be detected by the Chemical Detector:* BX24 (Cristanini S.p.A., Rivoli Veronese, Italy)
* BX29 (Cristanini S.p.A., Rivoli Veronese, Italy)
* SX34 (Cristanini S.p.A., Rivoli Veronese, Italy)
* RSDL® (E-Z-EM Inc., USA)
* M100 SDS (Guild Associates Inc., USA

Anti-gas powder calciumhypochlorit (21-24 %), CAS 7778-54-3: **cid:image004.gif@01D0E0CA.E81ACAF0** | M |  |  |  |
| **9** | **Test substances**The Chemical Detection system shall include C-test substances for simulation of **H**-, **V**- and **G**-gasses. | M |  |  |  |
| **10** | **Ruggedized** The Chemical Detector shall withstand mechanical and physical influences that can occur on the battleground (hereunder during use and/or transportation). | M |  |  |  |
| **11** | **Operating**The Chemical Detector shall, when the threshold of a detectable substance is reached, give off an alarm both acoustic and visually, in accordance with NATO document AC/225 D/100 section 5.1, or equivalent. | M |  |  |  |
| **12** | **Operating**Activation and deactivation of the Chemical Detector shall not be affected by the use of other electronic material nearby according to NATO document AC/225 D/100 section 4.14, or equivalent. | M |  |  |  |
| **13** | **Operating**The Chemical Detector shall on the start-up procedure conduct a self test of the detector’s functionalities.  | M |  |  |  |
| **14** | **Operating**The result of the self test of the detector’s functionalities shall be visible for the operator e.g. pass or fail. | M |  |  |  |
| **15** | **Operating**The Chemical Detector shall start and function in a contaminated area. | M |  |  |  |
| **16** | **Operating**Any text, instruction, result or information given by the Chemical Detector, shall be readable in all naturally occurring light conditions (e.g. from no sunlight to extreme sunlight). | M |  |  |  |
| **17** | **Operating**The language on the display shall be available in English. | M |  |  |  |
| **18** | **Operating**The display of the Chemical Detector shall be possible to switch off, blind or conceal.  | M |  |  |  |
| **19** | **Operating** The brightness (light intensity) of the display shall be adjustable. | M |  |  |  |
| **20** | **Carrying**The offer shall include a carry bag for the Chemical Detector. | M |  |  |  |
| **21** | **Carrying**The carry bag shall be furnished in ‘multi cam’ or equivalent camouflage pattern. | M |  |  |  |
| **22** | **Carrying**The offer shall include a transport case for the Chemical Detector that protects it from damages that can occur during transport, e.g. by ship, airplane, train or vehicle. | M |  |  |  |
| **23** | **Carrying**The transport case for the Chemical Detector shall be able to hold all the necessary parts and consumables for using the chemical detector. | M |  |  |  |
| **24** | **Power**The Chemical Detector shall run on batteries. | M |  |  |  |
| **25** | **Power**The Chemical Detector shall be able to use a standard cylindrical battery size as a power supply. (The standard cylindrical battery sizes are defined as AAA, AA, C and D.) | M |  |  |  |
| **26** | **Power**When the Chemical Detector is running on batteries the power lifetime shall be minimum 8 hours at 5 degrees Celsius without the need to change or charge the batteries. | M |  |  |  |

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| **No.** | **Requirement** | **Classification** | **DALO remarks** | **To be filled out by the tenderer** |
| **YES** | **Tenderer's description** |
| **27** | **Connection opportunities**The Chemical Detector shall transfer stored data to a computer using a USB cable.  | M |  |  |  |
| **28** | **Connection opportunities**Software to monitor the Chemical Detector, including transfer, store and read of data, shall be provided along with the Chemical Detector. | M |  |  |  |
| **29** | **Connection opportunities**All software for the Chemical Detector shall work in a Microsoft Windows environment.  | M |  |  |  |
| **30** | **Connection opportunities**The detector interface shall be an open application programming interface (API).  | M |  |  |  |
| **31** | **Connection opportunities**The Supplier shall deliver the information necessary to enable the Buyer to produce its own cables for the detector API. The information shall include: * Software protocol
* Detector physical access technology (RS232, Ethernet or similar)
* Detector housing connector
	+ Type (Plug or socket, size, pin connections)
	+ Supplier and part nr.
	+ Manufacturer and part nr.
	+ Manufacturer data sheet or similar
* Documentation of the coding of electrical signals to detector housing connector
* Preferred/prescribed type of cable
	+ Type
	+ Shielding
	+ Supplier and part nr.
	+ Manufacture and part nr.
	+ Manufacturer data sheet or similar
* Matching connector
	+ Type (Plug or socket, size, pin connections, type of backshell, etc.)
	+ Supplier and part nr.
	+ Manufacturer and part nr.
	+ Manufacturer data sheet or similar
* Software library (Software library for sensor integration (for windows 7/8 and Linux 3.x.x). Library shall be documented in an Interface Control Document. Examples shall be included to demonstrate the use of the library)

Schematic drawing of cable and connector coding including shielding strategy matching the detector physical interface and the documentation. | M |  |  |  |
| **32** | **Connection opportunities**The Buyer shall be entitled to submit the information enabling the Buyer to produce its own cables for the detector API to a third party in order to assign production of the cables to this third party. | M |  |  |  |
| **33** | **Data opportunities for the Chemical Detector**The open API shall send and receive all data, e.g. by publish/subscribe pattern, client/server pattern, or similar. | M |  |  |  |

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| **No.** | **Requirement** | **Classification** | **DALO remarks** | **To be filled out by the tenderer** |
| **YES** | **Tenderer's description** |
| **34** | **Safety**The Chemical Detector shall not contain or require chemicals or substances that can be of risk to unprotected personnel. | M |  |  |  |
| **35** | **Safety**The Chemical Detector shall not during use or storage give off vapors, aerosols or radiation that can be of danger to the personnel that are operating the Chemical Detector, working in the storage or that are in contact with the Chemical Detector. | M |  |  |  |
| **36** | **STANAG**The Chemical Detector shall fulfill the recommendation given in AEP-7 ed.5 regarding Decontamination (chapter 4), Design Guidelines (chapter 5), Acceptance Criteria and Protocols (chapter 7), CBRN decontaminants (Annex A), Chemical and biological contamination survivability of air force specific material (Annex C), and Test procedures (Annex D), or equivalent. | M |  |  |  |
| **37** | **CE**The Chemical Detector shall be CE approved. | M |  |  |  |
| **38** | **Climatic requirements**The Chemical Detector shall be operational in all seasons within climate zones A1, A2, A3, B1, B2, C0, C1, M1 and M2 given in STANAG 4370, AECTP 230, or equivalent. | M |  |  |  |
| **39** | **Climatic requirements**The Chemical Detector shall have been tested by all of the following methods in accordance with MIL-STD 810G, or equivalent:* Method 501.5 (High Temperature)
* Method 502.5 (Low Temperature)
* Method 506.5 (Rain)
* Method 507.5 (Humidity)
* Method 509.5 (Salt Fog)
* Method 510.5 (Sand and Dust)
 | M |  |  |  |
| **40** | **Maintenance**The Chemical Detector shall not require preventive maintenance or maintenance more than once every 8760 hours (one (1) year), notwithstanding user maintenance, e.g. change of sieve, battery, dust filter or other consumables. | M |  |  |  |
| **41** | **Maintenance**Maintenance shall be able to be done by the Danish Defence. | M |  |  |  |
| **42** | **Maintenance**All equipment for maintenance and calibration at the Danish Defence workshop level shall be part of this tender. | M | If there is need for equipment to do maintenance and calibration and it is of a not standard and non-proprietary variety it shall be included as part of the tender. |  |  |
| **43** | **Maintenance** Consumables shall be changeable at user level. | M |  |  |  |
| **44** | **Maintenance** Consumables shall be changeable in full CBRN PPE (Personal Protection Equipment). | M |  |  |  |
| **45** | **Maintenance**Tools needed for maintenance shall be of a standard and non-proprietary variety. | M |  |  |  |
| **46** | **Maintenance**After 6 months storage the Chemical Detector shall function unimpaired, without any other maintenance than user maintenance. | M |  |  |  |
| **47** | **Spare parts**The supplier shall as part of the tender deliver a package containing all necessary spare parts to keep the suggested Chemical Detector operational in a period of minimum 4 years. | M | This way DALO can keep the instrument operational without making an additional procurement within the first years. |  |  |
| **48** | **Consumables**The supplier shall as part of the tender deliver a package containing all necessary consumables to keep suggested Chemical Detector operational in a period of minimum 4 years. | M | This way DALO can keep the instrument operational without making an additional procurement within the first years. |  |  |
| **49** | **Certification**All spare parts and consumables shall be original or certified by the manufacturer of the detector. | M |  |  |  |
| **50** | **Spare parts catalogue**The supplier shall provide a list of the entire spare part and consumables catalogue for the instrument. | M | This way DALO will be able to identify the spare parts. |  |  |
| **51** | **Spare parts catalogue**The supplier shall provide a schematic drawing of the instrument where the different spare part with at least the part number is identified. | M | This way DALO will be able to identify the spare parts. |  |  |
| **52** | **Spare parts catalogue**If parts described within the catalogue for spare parts and consumables are not part of the offer it shall be clearly stated by the Supplier. | M |  |  |  |
| **53** | **Spare parts catalogue**The supplier shall ensure that DALO has a full updated spare part and consumables catalogue for each instrument mentioned in this document | M |  |  |  |
| **54** | **Spare parts catalogue**The supplier shall clearly in the spare parts catalogue describe:* All conditions and shelf life of the spare parts consumables which the Danish Defence shall take into consideration when procuring and during storage.
* The delivery time for each consumables offered
* The delivery time for each spare part offered
 | M |  |  |  |
| **55** | **Education and training**The supplier shall offer user Courses for personnel in the Danish Defence on the detector. The course shall be for at least 6 people and will be held in Denmark unless other is agreed on. | M | DALO expect the course to be held short time after delivery of the instruments |  |  |
| **56** |  **Education and training**The supplier shall offer maintenance Courses for personnel in the Danish Defence on the detector. The course shall be for at least 5 people and will be held at the suppliers facility unless other is agreed on. | M |  |  |  |