**Requirement Specification IR Blackbody Systems**

1. **Requirements**

**1.1. Description of the requirement**

DALO wants to acquire two flat Blackbody sources for calibration and test of InfraRed Cameras. The main use will be indoors but can be used outside in an environmental protected environment.

The calibration range needed goes from low to high temperature and demands high precision. This is probably best achievable by two Blackbody systems. Hence the requirements are divided into high and low temperature specifications.

Due to flexibility the system needs to be light enough for 2 persons to be able to carry the dismantled system in transport cases in and out of a van or from storage and to set up the system. For easy installation the system also has power requirements according to EU standard IEC 60309.

**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:

|  |  |
| --- | --- |
| "#" | ID number |
| "Requirement" | Requirement description |
| “System” | The requirement belonging to **high** temperature or **low** temperature system or both if the requirements are the same |
| "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 marked “SHALL” are mandatory requirements 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. All requirements marked “SHOULD” are evaluation requirements which evaluated in accordance with the Tender Conditions.

**1.4. Requirement and response sheet**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **#** | **Requirement** | **System** | **Classification** | **DALO remarks and evaluation** | **To be filled out be the tenderer** |
| **Requirement compliance****(tick a box)** | **Tenderer's description** |
| **YES** | **NO** |
| **REQUIREMENTS FOR LOW AND HIGH BLACKBODY SOURCE** |
| **1** | Both Systems SHALL have a heated surface of at least 255mmx255mm | Both | SHALL |  |  |  |  |
| **2** | Both Systems SHOULD have a heated surface of more than 255 x 255 mm | Both | SHOULD |

|  |  |
| --- | --- |
| **Size** | **Points** |
| 255 x 255 mm or more  | 1 |
| 270 x 270 mm or more | 2 |
| 280 x 280 mm or more | 3 |
| 290 x 290 mm or more | 4 |
| 300 x 300 mm or more | 5 |

 |  |  | [state the size of the heated surface of the Systems] |
| **3** | Both Systems SHALL have Ethernet control ability | Both | SHALL | *The System may have other control interfaces too like RS-232 or USB.* |  |  |  |
| **4** | Both Systems SHALL have a maximum weight of 45kg pr. part | Both | SHALL | *The System may contain multiple parts that needs to be put to­gether, but the maximum weight of one part is 45kg, to allow lifting of a crew of 2 persons.* |  |  |  |
| **5** | Both Systems SHALL run on 230V AC 50Hz or 400V AC 50Hz, 1 Phase or 3 Phase with a maximum current use of 16A pr. phase | Both | SHALL |  |  |  |  |
| **6** | The delivery time must be maximum 240 calendar days from submission of the purchase order. | Both | SHALL |  |  |  |  |
| **REQUIREMENTS FOR HIGH BLACKBODY SOURCE** |
| **7** | The System SHALL have a maximum temperature of at least 550° Celsius | High | SHALL |  |  |  |  |
| **8** | The System SHOULD have a maximum temperature of more than 550° Celsius  | High | SHOULD |

|  |  |
| --- | --- |
| **Temperature** | **Points** |
| 550° C to 559° C | 1 |
| 560° C to 569° C | 2 |
| 570° C to 579° C | 3 |
| 580° C to 589° C | 4 |
| 590° C or more | 5 |

 |  |  | [state the maximum temperature of the System] |
| **9** | The Systems SHALL have a temperature accuracy of maximum 0,7° Celsius.  | High | SHALL |  |  |  |  |
| **10** | The System SHOULD have a temperature accuracy of less than 0,7° Celsius.  | High | SHOULD |

|  |  |
| --- | --- |
| **Temperature** | **Points** |
| 0,7° C or lower  | 1 |
| 0,6° C or lower | 2 |
| 0,5° C or lower | 3 |
| 0,3° C or lower | 4 |
| 0,2° C or lower | 5 |

  |  |  | [state the temperature accuracy of the System] |
| **11** | The System SHALL have temperature stability of maximum 0,1° Celsius.  | High | SHALL |  |  |  |  |
| **12** | The System SHOULD have a temperature stability of less than 0,1° Celsius.  | High | SHOULD |

|  |  |
| --- | --- |
| **Temperature** | **Points** |
| 0,10° C or lower  | 1 |
| 0,08° C or lower | 2 |
| 0,06° C or lower | 3 |
| 0,04° C or lower | 4 |
| 0,02° C or lower | 5 |

  |  |  | [state the temperature stability of the System] |
| **13** | The System SHALL have a temperature uniformity of at least 4° over the surface | High | SHALL |  |  |  |  |
| **14** | The System SHOULD have a temperature uniformity of more than 4° over the surface | High | SHOULD |

|  |  |
| --- | --- |
| **Temperature** | **Points** |
| 4° C or lower  | 1 |
| 3,5° C or lower | 2 |
| 3° C or lower | 3 |
| 2,5° C or lower | 4 |
| 2° C or lower | 5 |

  |  |  | [state the temperature uniformity of the System] |
| **REQUIREMENTS FOR LOW BLACKBODY SOURCE** |
| **15** | The System SHALL have a maximum temperature of at least 110° Celsius | Low | SHALL |  |  |  |  |
| **16** | The System SHOULD have a maximum temperature of more than 110° Celsius  | Low | SHOULD |

|  |  |
| --- | --- |
| **Temperature** | **Points** |
| Between 110° C and 119° C | 1 |
| Between 120° C and 129° C | 2 |
| Between 130° C and 139° C | 3 |
| Between 140° C and 149° C | 4 |
| 150° C or more  | 5 |

  |  |  | [state the maximum temperature of the System] |
| **17** | The Systems SHALL have an absolute temperature accuracy of maximum +/- 0,1° Celsius  | Low | SHALL |  |  |  |  |
| **18** | The System SHOULD have an absolute temperature accuracy of the system of less than +/- 0,1° Celsius | Low | SHOULD |

|  |  |
| --- | --- |
| **Temperature** | **Points** |
| +/- 0,1° C or lower | 1 |
| +/- 0,09° C or lower | 2 |
| +/- 0,07° C or lower  | 3 |
| +/-0,05° C or lower | 4 |
| +/- 0,03° C or lower | 5 |

  |  |  | [state the temperature accuracy of the System] |
| **19** | The System SHALL have temperature stability of maximum 0,01° Celsius  | Low | SHALL |  |  |  |  |
| **20** | The System SHOULD have a temperature stability of less than 0,1° Celsius | Low | SHOULD |

|  |  |
| --- | --- |
| **Temperature** | **Points** |
| 0,1° C or lower | 1 |
| 0,08° C or lower | 2 |
| 0,06° C or lower  | 3 |
| 0,04° C or lower | 4 |
| 0,02° C or lower | 5 |

  |  |  | [state the temperature stability of the System] |
| **21** | The System SHALL have Temperature Uniformity of maximum 0,7° Celsius over the surface | Low | SHALL |  |  |  |  |
| **22** | The System SHOULD have a temperature uniformity of less than 0,7 ° over the surface | Low | SHOULD |

|  |  |
| --- | --- |
| **Temperature** | **Points** |
| 0,7° C or lower  | 1 |
| 0,6° C or lower | 2 |
| 0,5° C or lower | 3 |
| 0,4° C or lower | 4 |
| 0,3° C or lower | 5 |

 |  |  | [state the temperature uniformity of the System] |