**Attachment no 1 to**

***Specification of Essentials***

***terms of the public contract (SIWZ)***

**Delivery specification: X-ray tube with control unit**

**1. X-ray tube**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Parameter** | **Required** | **Offered\*** |
| 1. | Nominal tube voltage | 450 kV |  |
| 2. | Continuous rating | 1500 W |  |
| 3. | Two focal spots, size (acc. EN 12543) | max. 1 mm and 0.4 mm |  |
| 4. | Radiation cone | elliptical: max. 40° x max. 30° |  |
| 5. | Beam center indication | laser pointer |  |
| 6. | Connector | R28 |  |
| 7. | Weight, includes housing and anti radiation shield | max. 100 kg |  |
| 8. | Radiation leakage (dist. 1m; 450 kV, 3.3 A) | max. 5 mSv/h |  |
| 9. | Filament current | max. 5 A |  |
| 10. | Filament voltage | max. 7 V |  |
| 11. | Inherent filtration | 5 mm Be |  |
| 12. | Target material | W |  |
| 13. | Target angle | 11° |  |

**2. Generator**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Parameter** | **Required** | **Offered** |
| 1. | Voltage range | 20 - 450 kV |  |
| 2. | Voltage step | 1 kV or smaller |  |
| 3. | Voltage accuracy | 1% of maximal value, or better |  |
| 4. | Voltage reproducibility | 0.01% of maximal value, or better |  |
| 5. | Long term voltage stability | 0.1% of maximal value, or better |  |
| 6. | Emission current range | 0 - 15 mA |  |
| 7. | Emission current step | 0.01 mA or smaller |  |
| 8. | Emission current accuracy | 0.2% of maximal value, or better |  |
| 9. | Emission current reproducibility | 2 uA or better |  |
| 10. | Emission current stability | 0.1% or better |  |
| 11. | Ramp-up and ramp-down time | max. 300 ms |  |
| 12. | Connection to computer | Ethernet and RS 232 or 485 |  |
| 13. | Dimensions (HxWxL) | max. 100cm x 60cm x 70cm |  |
| 14. | Weight | max. 250 kg |  |
| 15. | Protection class | IP54 |  |
| 16. | Connector | R28 |  |
| 17. | Power supply | One phase, 230V (or compatible) 50Hz, grounded through the supply cable |  |
| 18. | Security locks | two |  |
| 19. | Key switch | 3 positions: ON, OFF, STANDBY |  |
| 20. | Tube identification | automatic |  |
| 21. | Exposure calculator | for: Fe, Cu, Al |  |
| 22. | Ability to save predefined exposure parameters | memory for at least 200 |  |
| 23. | Display | with min. 320x240 px resolution |  |
| 24. | Parameters monitor | Continuous, direct display of: temperatures, pressure, voltages |  |

**3. Cooler unit**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Parameter** | **Required** | **Offered** |
| 1. | Compatibility | compatible with the tube |  |
| 2. | Weight (without coolant) | max. 60 kg |  |
| 3. | Dimensions (LxWxH) | max. 80x50x70 [cm] |  |
| 4. | Power supply | One phase, 230V (or compatible) 50Hz, grounded through the supply cable |  |
| 5. | Protection class | IP21 |  |
| 6. | Power cable | min. length: 10 m |  |
| 7. | Control cable | min. length: 10 m |  |
| 8. | Cooling hoses | Two hoses; min. length: 10 m |  |

**4. Additional equipment**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Required equipment** | **Parameters** | **Offered** |
| 1. | HV cable | compatible with the tube and the generator; min. 5 m length; includes flanges |  |
| 2. | System tests | System tests certificate |  |
| 3. | Documentation | In Polish or English language |  |
| 4. | Control software | For PC class computers |  |
| 5. | Manual controller | operated with touchscreen |  |

\* The Supplier is obliged to fill in the column to confirm they fulfill the Purchaser’s requirements.