



SPECIFICATION

Micro-focus X-ray source for X-ray Radiography/ Tomography

1. Scope

This specification describes the requirements for a microfocus X-ray source (hereinafter “the System”) to be used for X-ray radiography and tomography. The System will be used by the Commissariat à l'Energie Atomique at its Centre de recherche nucléaire de Birine, Algeria (hereinafter “the End-User”). The End-User has a neutron imaging system at its research reactor. The System will be incorporated into a facility to be designed and built by the End-User to provide complementary X-ray imaging capability. Bidders may refer to Kaestner et al. (Section 2) where a similar setup is described for further details of the general intent.

The scope consists solely of the X-ray source and does not include detectors, shielded cabinet or sample manipulators.

2. Applicable Documents

The following documents shall be applicable for this Specification to the extent specified hereinafter:

- IEC 61010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements (or equivalent standard)
- A.P. Kaestner, et al., Bimodal Imaging at ICON Using Neutrons and X-rays, Physics Procedia 88 (2017), 314-321, <https://doi.org/10.1016/j.phpro.2017.06.043>.

In the event of conflict between the documents listed above and the content of this Specification, the content of this Specification shall take precedence to the extent of the conflict.

3. Requirements

3.1. Functional and Performance Requirements

The System shall meet the following functional and performance requirements:

- 3.1.1. Shall be suitable for nondestructive X-ray radiography and tomography;
- 3.1.2. Shall be supplied with a built-in X-ray tube;
- 3.1.3. Shall be air-cooled;
- 3.1.4. Shall be capable of variable focus;
- 3.1.5. Shall provide a conical beam;
- 3.1.6. Provide a continuous X-ray beam;
- 3.1.7. Shall come supplied with any software that is required for it to perform the full range of manufacturer's performance expectations with a perpetual cost-free licence; and
- 3.1.8. Shall operate in standard non-condensing laboratory conditions typical of Algeria.



3.2. Technical Requirements

The System shall meet the following technical requirements, and shall:

- 3.2.1. Provide an output power of 50 W or more;
- 3.2.2. Have a variable operating range covering at least the range 20 to 100 kV;
- 3.2.3. Have a tungsten target and beryllium window;
- 3.2.4. Have a variable focal spot size of 5 to 40 mm (micron) or greater;
- 3.2.5. Be externally controllable via industry-standard communication interfaces;
- 3.2.6. Be supplied with a suitable high voltage power supply that shall function with the standard single-phase power available at the End-User's premises: 230 V AC, 50 Hz;

4. Marking

The System shall have all safety markings in the French (preferably) or English languages.

5. Packing

The System, for the shipment by air to the End-User, shall be packed in accordance with international standards that are applicable for the shipment by air of this kind of equipment.

6. Quality Requirements

- 6.1. The System shall be manufactured and shipped in accordance with the Contractor's ISO quality assurance system or an equivalent quality assurance system.
- 6.2. The Contractor shall document the compliance with this quality assurance system.

7. Testing and Acceptance

The System, prior to shipment, shall be tested for conformance of the System with manufacturer's performance specifications and the minimum requirements specified herein.

8. Deliverable Data Items

The Contractor shall provide two (2) complete sets of operation and servicing manuals and technical drawings in the French (preferably) or English languages.