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INCH-POUND

A-A-58077
6 August, 1996

COMMERCIAL ITEM DESCRIPTION

X-RAY APPARATUS SET, RADIOGRAPHIC, INDUSTRIAL, PORTABLE
160KVCP

The General Services Administration has authorized the use of this commercial item description for all federal agencies.

1. Scope. This commercial item description contains the technical and performance requirements for a light weight, portable x-ray apparatus set, industrial. The set shall consist of an end-grounded, gas insulated, panoramic tube head or directional tube head , a control unit and cooling unit. The x-ray apparatus set shall be designed for field use to perform radiographic inspection of metallic and nonmetallic, aerospace and non aerospace equipment.

2. Classification. The light weight, portable x-ray apparatus set 160 KVCP, industrial shall conform to the following types:

2.1 Types. Type 1 is the x-ray apparatus set with a panoramic tube head.
Type 2 is the x-ray apparatus set with a directional tube head.

3. Salient characteristics.

3.1 The x-ray apparatus set shall consist of an x-ray tube head, a control unit, and a liquid cooling unit.

3.2 The system major components shall be interchangeable with other system major components of the same make and model without degradation of performance. The interchangeablitiy of major components shall not change the output of the x-ray source by more than ±3%.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving the document should be addressed to San Antonio ALC/TILDD, Bldg. 171 Kelly AFB TX 78241-5916 Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 6635

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3.3 The x-ray apparatus shall be supplied with the following accessories: transit cases, cable assemblies, coolant hoses, light weight laser pointer, interlock connector, safety lock keys and manuals.

3.4 The cooling method shall be of a closed loop design between the cooling unit and the tube head anode.

3.4.1 The coolant shall not contain chemicals, subtances or compounds as listed in SD-14, Listing of Toxic Chemicals, Hazardous Substances and Ozone Depleting Chemicals.

3.5 Input power shall automatically adapt from 100 to 130 VAC, 50/60 Hz, 20 amperes maximum to 200 to 250 VAC, 50/60 Hz, 10 amperes maximum and include automatic adaptability to portable generator power.

3.5.1 The components shall be equipped with circuit breakers to prevent damage to components in the event the voltage tolerances and/or proper current levels are exceeded. The circuit breakers shall provide protection to these components when large voltage or current surges are experienced.

3.5.2 Transient-State Conditions. The system shall not experience degradation of performance after the conditions defined in MIL-T-28800, paragraph 3.4.5.2.2.

3.5.3 The system shall be protected from input voltages and frequencies that exceed the steady state envelope conditions in paragraph 3.5.2. If such events should occur the system shall protect itself by automatically disconnecting itself from the power source until the discrepancy is eliminated.

3.6 X-ray output shall be adjustable in 5 KVCP steps minimum over the range of 20 to 160 KVCP and in 0.1 steps minimum over the range of 0.1 to 5.0 mA constant potential, and there shall not be more than 2% ripple.

3.7 All high voltages shall be generated in the tube head.

3.8. The duty cycle shall be 100% at 120° F ambient temperature at 160 KV and 5mA.

3.9 The effective focal spot shall be no greater than 0.060 sq inch as per ASTM E1165-92.

3.10 The x-ray tube window shall be 0.093 inches thick or less of Beryllium.

3.11 Radiation output shall be no less than 230 R/min at 19.685 in. (unfiltered) at 160KV/5mA, and no less than 13 R/min. at 19.685 in., 160 KV/5mA through 0.50 inch of 1100 aluminum.

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3.12 The Hunter and Driffield (H&D) density shall not be less than 2.0 units through 2.0 inches of 1100 aluminum at a source to film distance of 36 inches in 3 minutes or less on Eastman Type M or equivalent film when operating at 160 KV and 5 mA.

3.13 The x-ray unit shall be capable of showing a 0.010 inch hole in a 0.010 inch thick aluminum penetrameter placed on a 1.0 inch thick test block of 1100 aluminum at a source to film distance of 36 inches on Eastman Type M film or equivalent.

3.14 The x-ray unit shall be capable of showing a density difference of 2.5 H&D units between aluminum foil of 0.003 inches and 0.03 inches thickness at 36 inches source to film distance on Eastman Type M or equivalent.

3.15 The liquid coolant unit shall be capable of maintaining the x-ray tubehead within normal operating temperatures when the x-ray tubehead is +100 feet in elevation from the cooling unit.

3.16 Ambient temperature range shall be from 0°F to 120°F.

3.17 Storage temperature range shall be from -30°F to 160°F.

3.18. A timer for exposure shall be capable of being set from 0.1 to 99.9 minutes in 0.1 minute or smaller increments.

3.19 Ruggedized transit case(s) made of corrosion resistant materials shall be provided for all major subassemblies and accessories.

3.19.1 The ruggedized transit cases shall be watertight (just over the top of case only) and be designed to provide protection against shock, vibration, and environmental conditions IAW MIL-T-288000, Style T, sinusoidal vibration test, mechanical shock test, transit drop test and water resistance test.

3.19.2 The ruggedized case(s) with contents which exceed the one man lift of 44 lbs shall be prominently labeled with the total weight and lift limitations, and under no condition shall the two person lift of 88 lbs be exceeded.

3.20 The x-ray system shall incorporate the following safety features.

3.20.1 <u>X-ray tubehead</u>.

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3.20.1.1 The x-ray tubehead shall not be a source of ignition of volatile atmospheres as defined by the National Fire Protection Association (NAFPA) 70 Article 500 for Class 1, Division 2, Group D during both operation and nonoperation of the tubehead.

3.20.1.2 The tubehead shall have a pressure gage, pressure relief valve, and low pressure cut-out switch (25 psi).

3.20.1.3 A thermal cut-out shall be provided to prevent operation if the tubehead overheats.

3.20.2 The cooling unit shall incorporate a coolant flow sensor.

3.20.3 The panoramic tube head shall have a 360° field of view.

3.20.4 The directional tube head shall have a 40° field of view.

3.20.3 Control unit.

3.20.3.1 The control unit shall incorporate a safety key switch.

3.20.3.2 The control unit shall have microcomputer based diagnostics.

3.20.3.3 The control unit shall include a continuous display to indicate tubehead voltage set, tubehead voltage applied, tube head current set, tubehead current applied, time set and time elapsed/remaining.

3.21 The x-ray unit must be compatible with the following external interlock system: NSN 6635-00-292-7637, Winding Specialists Co. Part number WS1213, X-ray Interlock Assembly.

3.22 Physical specifications must not exceed the following dimensions or weights (see notes 1 and 2).

3.22.1 Tube Head:
Diameter[1] 6.88 inches - 7.25 inches, Weight - 37 lbs[1], 88 lbs[2]

3.22.2 Control Unit:
Height[1] - 18 inches, Depth[1] -12 inches, Width[1] - 18 inches, Weight - 44 lbs[1], 88 lbs[2]

3.22.3 Cooling Unit:
Weight - 88 lbs[2]

1 Maximum dimension or weight when not enclosed in the ruggedixed transit case to meet one person carry requirements.
2 Maximum weight including ruggedized transit case as specified in 3.19.2.

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3.23 The cable connectors shall be constructed in such a way that each end uniquely fits its intended connector.

3.24 A lightweight laser pointer which complies with 21 CFR 1040 shall be provided.

3.25 The carrying cases, control unit and cooling unit shall have collapsible handles with permanent stops to prevent collapsing while handles are in use.

4. Regulatory requirements. The contractor is encouraged to use recovered materials in accordance with Public Law 94-580 to the maximum extent practical.

4.1 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pounds unit, provided they fall within specified tolerances using conversion tables contained in the latest revision of Federal Standard No. 376, and all other requirements of this Commercial Item Description are met. If a product is manufactured to metric dimensions and those dimensions exceed tolerances specified in the inch-pound units, a request should be made to the contracting officer to determine if the product is acceptable. The contracting officer has the option of accepting or rejecting the product.

5. Quality assurance provisions.

5.1 Product conformance. The products provided shall meet the salient characteristics of this commercial item description, cinform to the proudcer's own drawings, specification, standards, and quality assurance practices, and be the same product offered for sale in the commercial market. The goverment reserves the right to require proof of such conformance.

5.2 Market acceptance criteria. A commercial item which has been on the market over 1 year is required to ensure serviceability, reliability, and quality of materials .

6. Preservation, packaging, packing, labeling, and marking. Preservation, packaging, packing, labeling, and marking shall be specified in the contract or order.

7. NOTES

7.1 Part Number Identification (PIN). The following part identification numbering prodedure is for government purposes and does not constitute a requirement for the contractor.

This example describes a part numbering system for CID A-A-58077:

AA58077-1 or 2

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TYPE : 1-Panaromic tube head
2-Directional tube head

7.2 Address for obtaining reference documents.

National Fire Protection Association (NFPA)
70 Article 500 for Class 1, Division 2, Group D
One Batterymarch Park
P. O. Box 9101
Quicny MA 02269-9101

ASTM E1165-92 Standard test Method for Measurement of Focal Spots of Industrial X-ray Tubes by Pinhole Imaging
American Society for Testing and Materials
100 Barr Harbor Drive
West Conshokocken Pa 19428

MIL-T-28800
Defense Printing Services Detachment Office, Order Desk
700 Robbins Ave
Philadelphia, PA 19111-5094.

SD-14 Listing of Toxic Chemicals, Hazardous Substances and Ozone Depleting Chemicals
Defense Printing Services Detachment Office, Order Desk
700 Robbins Ave
Philadelphia, PA 19111-5094.

7.3. Procurement data. The procuring activity should specify the preferred options permitted herein and include the following information in procurement documents:

a) Title, number, and date of this description.
b) Specify special packaging requirements.
c) certification of commercial item prior to first contract delivery.

7.4 National Stock Number(s).

NSN	REFERENCE NO.	CAGEC
6635-01-430-2572	3-000-0724	0DTG5

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NSN	REFERENCE NO.	CAGEC
6635-01-417-1830	3-000-0723	0DTG5
6635-01-394-5926	SA-ALC/LDNCID0164	98750

MILITARY INTEREST:

CIVIL AGENCY COORDINATING ACTIVITY: GSA-FSS

CUSTODIANS:
Air Force-99

PREPARING ACTIVITY:
AIR FORCE-82

AGENT:
AIR FORCE-99

PROJECT NUMBER: 6635-0164