

INCH-POUND

MIL-PRF-49293A(CR)

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SUPERSEDING

MIL-R-49293(CR)

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PERFORMANCE SPECIFICATION RADIAC SET, AN/PDR-75

This performance specification is approved for use by USACECOM, Department of the Army and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This performance specification covers the Radiac Set, AN/PDR-75.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2). Handbooks are for guidance only and therefore are not mandatory.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: HQ, USA Communications-Electronics Command, ATTN: AMSEL-LC-LEO-E-EP, Fort Monmouth, NJ 07703 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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HANDBOOKS

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DEPARTMENT OF DEFENSE

MIL-HDBK-454	- Standard General Requirements for Electronic Equipment.
MIL-HDBK-781	- Reliability Design Qualification and Production Acceptance Tests.

(Unless otherwise indicated, copies of the above specification, standards and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094).

2.2.2 Other Government documents, drawings and publications. The following Government documents, drawings and publication form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

DRAWINGS

C5085500	- Radiac Set AN/PDR-75
C5085357	- Computer-Indicator Radiac CP-696/PDR-75
C5085373	- Case, Carrying CY-8420/PDR-75
C5085549	- Cable Assembly
C5085550	- Cable Assembly
C5085551	- Cable Assembly
C5085583	- Battery Connector Case Assembly

PUBLICATIONS

A3160505	- Nuclear Survivability Requirements for Detector, Radiac DT-236/PD and Computer Indicator, CP-696()UD, 18 March 1974
TB 9-6665-286-35	- Calibration Procedure for Radiac Set, AN/PDR-75
MK-2512/PDR-75	- Maintenance Kit

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(Copies of documents, drawings and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer).

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation.(see 6.2)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C63.14-1994 - Electromagnetic Compatibility (EMC) etc.;
Dictionary for Technologies of

(Application for copies should be addressed to the American National Standards Institute, Inc. 1430 Broadway, New York, NY 10018).

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified in the contract (see 6.2), the contractor shall furnish first article units for inspection (see 4.3).

3.2 Materials. The contractor shall select the materials, but the materials and parts used shall be fully capable of meeting all of the operational and environmental requirements specified herein. The materials specified in the applicable drawings are recommended, but are not mandatory. Selection criteria of the class, grade or type part shall be that the material will be able to perform its intended function when it is assembled. Verification of the supplier meeting the overall performance requirements shall be the governing acceptance standard. Recovered materials shall be used to the maximum extent possible.

3.3 Design.

3.3.1 Dimensions. The following components of the Radiac Set, AN/PDR-75 shall meet the dimensions and dimensional tolerances of their respective drawings (as follow) to ensure accurate physical interface with existing hardware.

Computer -Indicator Radiac, CP-696/PDR-75	C5085357
Carrying Case, CY-8420/PDR-75	C5085373

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Cable Assembly (BA-5590/U to CP-696/PDR-75)	C5085549
Cable Assembly (Vehicular Battery to CP-696/PDR-75)	C5085550
Cable Assembly (M10A1 power supply to CP-696/PDR-75)	C5085551
Battery Connector Case Assembly	C5085583

3.3.2 Calibration of the AN/PDR-75 reader. The AN/PDR-75 field reader shall be calibrated in accordance with the calibration procedure described in Department of the Army Technical Bulletin, TB 9-6665-286-35. The reference lockset in Maintenance Kit, MK-2512/PDR-75 shall be calibrated every 6 months by the U.S. Army Test Measurement and Diagnostic Equipment (TMDE) Support Group.

3.3.3 Finish. All surfaces of the CP-696/PDR-75 requiring a protective coating shall be finished with a green chemical resistant polyurethane coating.

3.3.4 Interchangeability. Like units, subassemblies and replaceable parts shall be electrically and mechanically interchangeable.

3.3.4.1 Electrical and mechanical interchangeability demonstration test (EMIDT). The EMIDT shall be conducted to validate that the equipment possesses such functional and physical characteristics as to be equivalent in performance to another item of identical purpose. The interchanged items shall be capable of exchange with identical purpose items without selection for fit or performance and without alteration of the item or adjoining items, except for adjustment.

3.4 Dimensions.

3.4.1 Size and weight. The total weight of the Radiac Set, AN/PDR-75 shall not exceed 35 lbs. (15.8 Kg). The external dimensions of the CP-696/PDR-75 are:

Width:	8.09 in. (205mm)
Height:	7.52 in. (191mm)
Depth:	13.11 in. (333mm)

The external dimensions of the carrying case are:

Width:	13.16 in. (334mm)
Height:	12.50 in. (315mm)
Depth:	21.75 in. (555mm)

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3.5 Performance requirements.

3.5.1 Accuracy. The CP-696/PDR-75, when reading DT-236/PDR-75 dosimeters, shall, as a system, have an accuracy of ± 30 percent or ± 30 cGy, which ever is greater, at the 200 cGy level of the true dose delivered to the dosimeter at the temperature limits of -25°F (-32°C) and $+125^{\circ}\text{F}$ ($+52^{\circ}\text{C}$). The system accuracy between the two temperature limits shall improve, such that at room temperature, the accuracy shall be ± 20 % or ± 20 cGy, which ever is greater.

3.5.2 Precision. DT-236/PDR-75's dosed to 500 cGy and read on the AN/PDR-75, field reader shall exhibit readings ± 5 % of its own mean with a 95 % confidence level.

3.5.3 Reading rate. The AN/PDR-75 shall be designed to allow reading at least 60 DT-236/PDR-75's per hour.

3.5.4 Voltage range. The AN/PDR-75 shall operate at voltages between 21 to 30 volts DC.

3.5.4.1 Power supply transient voltage. The AN/PDR-75 shall provide protection from vehicular/charging system transients up to 40 volts for less than 50 milliseconds or 600 volts for less than 10 microseconds.

3.5.5 Orientation. The AN/PDR-75 shall operate when inclined ± 20 degrees from the normal (0°) orientation.

3.5.6 Burn-in. Each CP-696/UD shall be operated for a minimum of 24 hours under the conditions specified in 4.9. The burn-in shall be concluded by a failure free period, the duration of which shall be not less than 12 hours. Performance shall be monitored as specified in 4.9 and its subparagraphs.

3.6 Environmental conditions. The AN/PDR-75 shall be subjected to and meet the environmental conditions below. For the purpose of environmental conditions, specified performance is defined as meeting the following requirements:

<u>Requirement paragraph</u>	<u>Measurement</u>
3.5.1	Accuracy
3.5.2	Precision

3.6.1 High temperature: The AN/PDR-75 shall not be damaged or experience any degradation of performance after being operated at 125°F ($+52^{\circ}\text{C}$) or stored at $+160^{\circ}\text{F}$ ($+71^{\circ}\text{C}$).

3.6.2 Low temperature. The AN/PDR-75 shall not be damaged or experience any degradation of performance after being operated at -25°F (-32°C) or stored at -70°F (-57°C).

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3.6.3 Humidity. The AN/PDR-75 shall not be damaged or experience any degradation of performance following exposure to relative humidity of 94, ± 4 percent.

3.6.4 Altitude. The AN/PDR-75 shall not be damaged or experience any degradation of performance following transport by aircraft to 40,000 feet (12,192m) (non-operating) and operation at altitudes up to 10,000 feet (3,048m).

3.6.5 Immersion. The AN/PDR-75, in its carrying case, shall not be damaged or experience any degradation of performance after being immersed in fresh water to a depth of not less than 3.3 feet (1 meter) for a period of 30 minutes.

3.6.6 Shock, transit drop. The AN/PDR-75, in its carrying case, shall not be damaged or experience any degradation of performance after being subjected to a sequence of shocks applied in each direction along each of 3 mutually perpendicular axes (horizontal and vertical). Shocks shall be half sine pulses having a time duration of 4 milliseconds, $\pm 5\%$. Shock pulses shall have a peak amplitude of 100 g's ± 15 g's.

3.6.7 Vibration. The AN/PDR-75 shall withstand, without damage, simple harmonic motion having an amplitude of ± 0.015 inches (0.030 inch total excursion) with the frequency being varied between 5-55 Hz.

3.6.8 Shock, bench handling. The AN/PDR-75 shall not be damaged or experience any degradation of performance after being subjected to normal bench handling shocks.

3.6.9 Dust. The AN/PDR-75 shall resist the adverse effects of dust particles which may penetrate the case. The AN/PDR-75 shall not be damaged or experience any degradation of performance, effectiveness, reliability, and maintainability due to the erosion, abrasion or the clogging effect of sand particles.

3.6.10 Salt fog. After the salt fog test (see 6.3), the AN/PDR-75 shall operate without degradation in specified performance and shall show no evidence of degradation such as flaking, pitting, blistering or loosening of finish on metal surface or exfoliation. Also, there shall be no binding or clogging of mechanical parts. Drawer contacts should be cleaned prior to performance of operational checks to ensure contact with DT-236/PDR-75 dosimeters.

3.6.11 Fungus. The AN/PDR-75, as prepared for operation, shall be subjected to the fungus test. There shall be abundant growth colonization on 50 percent or more of the area of the control item after 14 and 28 days. No cleaning of the reader is permitted for 72 hours prior to the fungus test. Handling, prior to and during testing, shall be accomplished without contamination of the reader (see 6.3). After the fungus test, the AN/PDR-75 shall be visually examined. The reader shall show no more than sparse microbial growth with restricted tubular growth development in an area 10 percent or less of the total area and no more than 6 unrelated minute circuit portions such as terminal spacing, printed circuit boards, etc., with sparse growth due to random contamination or traces of unmixed material ingredients. In addition, the reader shall operate without degradation in specified performance after the test of 4.6.11.

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3.6.12 Temperature shock. The equipment shall be capable of withstanding temperature shocks between -65°F (-54°C) and +145°F (+63°C).

3.7 Nuclear survivability. The AN/PDR-75 shall be subjected to the nuclear environmental conditions specified in A3160505. The reader shall be energized during exposure. The AN/PDR-75 shall meet the specified performance after being subjected to the nuclear environment.

3.7.1 Electromagnetic pulse (EMP). The AN/PDR-75 shall be placed within a long wire electromagnetic pulse facility or its equivalent in the following orientations:

- a. Power cables extend parallel to the electric field and perpendicular to the magnetic field; all individual units under the long wire, but widely separated.
- b. Power cables coiled on the ground; all units centrally located under the long wire. Test data shall satisfy the EMP requirements in accordance with A3160505.

3.7.2 Thermal radiation. The AN/PDR-75 shall be subjected to the thermal radiation levels specified in A3160505 without damage. Since the available simulation facilities provide these thermal radiation levels only over relatively small areas, many individual exposures will be required so that each of the exposed surfaces (case, meters, knobs cables, and other outboard components) will receive the required thermal exposure. The AN/PDR-75, when so exposed, shall show no degradation and shall meet specified performance.

3.7.3 Nuclear air blast. The AN/PDR-75 shall be placed in a nuclear air blast simulation facility and exposed to the air blast environment as specified in A3160505. The reader shall meet the specified performance following this test.

3.7.4 Initial nuclear radiation. The complete reader shall be exposed to a LINAC and a pulsed or fast burst reactor in such a manner that all electronic piece parts and circuits in the set receive the neutron and gamma doses and rates specified in A160505. The reader shall meet specified performance of 3.5.1 and 3.5.2.

3.8 Electromagnetic interference. The AN/PDR-75 shall meet the following emission and susceptibility requirements and the requirements of this specification. The procedures recommended in 6.5 may be used as guidance.

CE101 (1)	CE101 (1) CE102	CS101 CS102 (2) CS115	RE102	RS103(4)
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- a. The power supply switching frequency and its harmonics below 267 KHz are allowed to exceed the limit by a maximum of 10 dB.

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- b. The injected interfering signal shall be 1 KHz, 50% AM.
- c. The power supply switching frequency and its second and third harmonics are allowed to exceed the limit by a maximum of 20 dB.
- d. The frequency range of test shall be 10 KHz to 10GHz with the AN/PDR-75 immersed in the following radiated electric fields.

Frequency range	Field intensities	Modulation characteristics
0.01 - 2 MHz	1V/M	AM 50% 1 KHz tone
2 - 30 MHz	5V/M	“
30 - 2000 MHz	10V/M	“
2 - 10 GHz	5V/M	“

- e. All electromagnetic interference (EMI) tests shall be performed for both AC power and DC power and DC power operations. For frequencies between 300 and 450 MHz and field intensities of 8 to 10 volts/meter an increase in reading variation of up to ± 20 cGy is allowable.

3.8.1 Bonds and grounds. Bonding for equipment current path returns, RF potentials and shock hazards shall be installed so that expansion, contraction, or movement incident to normal service use and maintenance will not break or loosen the connections. Surface preparation for bonds and grounds shall be accomplished by removing all anodic film, grease, paint, lacquer or other high resistance coatings from the immediate areas of contact. The equipment finish shall be restored to its original condition. The DC resistance of bonds and grounds shall not exceed 25.0 milliohms.

3.8.2 Cables and connectors. Shielded cables, when required, shall have a shield weave providing 90% coverage. For guidance, refer to requirement 11 of MIL-HDBK-454.

3.9 Reliability. The AN/PDR-75 shall have a specified (O_0) mean-time between failure (MTBF) of 800 hours. The lower test MTBF (O_1) shall be 400 hours. The reliability requirements shall be demonstrated when operating under the following conditions:

- a. Operating temperature: -25°F to +125°F, (-32°C to +52°C)
- b. Environment: Ground mobile
- c. Duty cycle: 100%

NOTE: Use of MIL-HDBK-781 is recommended.

3.10 Safety engineering.

3.10.1 Personnel hazards. Personnel hazards shall be kept to a minimum. Compliance with these requirements will be verified through a visual inspection.

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3.10.2 Corner and edge rounding. All exposed corners and edges shall be rounded to eliminate possible injury to personnel due to laceration and cuts.

3.10.3 Radioactive materials. Radioactive materials shall not be used (e.g., luminous dials/markings, electron tubes, surge arrestors and lenses).

3.11 Nameplate and marking.

3.11.1 Front panel markings. See Requirement 67 of MIL-HDBK-454 for guidance.

3.11.2 Nameplates. Each nomenclatured item shall have a nameplate. See Requirement 67 of MIL-HDBK-454 for guidance.

3.11.3 Serial numbers. Each CP-696/PDR-75 shall be serial numbered in accordance with the contract (see 6.2.k).

3.12 Workmanship. All electronic parts, components, assemblies and sub-assemblies shall be free of smudges, excess solder, metal chips or the existence of any foreign material on any surface. Bearing assemblies shall be free from rust, dirt or tool marks. Wires and integrated circuitry shall be protected from contact with rough or irregular surfaces and shall be shielded from shorting.

4. VERIFICATION

4.1. Calibration of field reader, AN/PDR-75. The contractor shall perform calibration as described in TB 9-6665-286-35 of the Field Reader, AN/PDR-75, as required in paragraph 3.3.2 prior to operating the unit before and after conduction of the tests specified in the Section 4 of this specification.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First Article inspection (see 4.3).

(1) Inspections covered by subsidiary documents (see 4.3.3).

b. Conformance inspection (see 4.4).

4.3 First article. Unless otherwise specified in the contract, the first article inspection shall be performed by the contractor (see 3.1).

4.3.1 First article units. The contractor shall furnish 12 first article units of the Radiac Set, AN/PDR-75.

TABLE I. First article inspection.

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Inspection	Req't para	Test para	Order of tests <u>2/</u>					
			Unit	Unit	Unit	Unit	Unit	
			1	2	3	4-7	8-12	
1. Inspections covered by subsidiary documents <u>1/</u>	3.3.3 3.11,3.12	4.4.3	Inspection to be performed on all units.					
2. Burn-In <u>1/</u>	3.5.6	4.5.6	Inspection to be performed on all units.					
3. Group A inspection <u>1/</u>	See Table II		Inspection to be performed on all units					
4. Group B inspection <u>1/</u>	See Table III		Inspection to be performed on all units.					
5. Group C inspection Ambient temperature <u>4/</u>								
High temperature	3.6.1	4.6.1	1					
Low temperature	3.6.2	4.6.2	2					
Humidity	3.6.3	4.6.3	4					
Immersion	3.6.5	4.6.5		3				
Dust	3.6.9	4.6.9		2				
Vibration	3.6.7	4.6.7			1			
Shock, Transit drop	3.6.6	4.6.6			2			
Shock, Bench handling	3.6.8	4.6.8			3			
Salt fog	3.6.10	4.6.10		4				
Fungus	3.6.11	4.6.11			4			
Altitude	3.6.4	4.6.4		1				
Temperature shock	3.6.12	4.6.12	3					
6. Unique first article tests								
Transient voltage <u>4/</u>	3.5.4.1	4.5.4.1						
Reading rate <u>3/</u>	3.5.3	4.5.3				1		
Orientation	3.5.5	4.5.5				2		
Nuclear survivability	3.7	4.7						
Nuclear air blast	3.7.3	4.7.3				4		
Thermal radiation	3.7.2	4.7.2				5		
Electromagnetic pulse	3.7.1	4.7.1				6		
Initial nuclear radiation	3.7.4	4.7.4				6		
Electromagnetic interference	3.8	4.8				7		
7. Group D Reliability	3.9	4.9						1

1/ The inspection 1 to 4, in the order shown, shall be performed on all first article units before subjecting these units to any other inspection requirements

2/ The numbers in the unit columns in the table, covered by inspections 5 and 6, specify the order of inspections for the indicated units. Each of the 4 nuclear survivability tests shall be performed on one unit only after tests 1 and 2. The electromagnetic pulse test will be performed on unit 6 before the initial nuclear radiation test.

3/ This test involves human performance reliability and equipment compatibility.

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4/ Test to be performed on all first article test units.

4.3.2 First article inspection. The first article inspection shall consist of the inspection specified in Table I and shall be performed in the order specified.

4.3.3 Inspections covered by subsidiary documents. The following shall be inspected under the applicable subsidiary documents as part of the inspection required by this specification and the inspection requirements specified in the contract.

<u>Item</u>	<u>Where required</u>
Finish	3.3.3
Nameplate and marking	3.11
Workmanship	3.12

4.4 Conformance inspection. The contractor shall perform the inspections specified in 4.3 and 4.4.1 through 4.4.4. This does not relieve the contractor of his responsibility for performing any additional inspection which is necessary to control the quality of the product and to assure compliance with all specification requirements.

4.4.1 Group A inspection. Each unit on contract or purchase order shall be inspected for conformance to the inspections in Table II. Lots shall be formed from units that pass this inspection. Each lot shall be subjected to sampling inspection as specified in the contract or purchase order. Lots in which samples exhibit any failure shall be screened for that failure prior to being subjected to Group A inspection.

4.4.1.1 Order of inspection within Group A. A Group A inspection shall be performed in an order satisfactory to the Government.

TABLE II. Group A inspection.

Inspection	Requirement paragraph	Test paragraph
Accuracy <u>1/</u> <u>2/</u>	3.5.1	4.5.1
Precision	3.5.2	4.5.2
Visual and mechanical	3.1	4.11
Safety engineering	3.10	4.10

1/ All performance defects are major.

2/ Accuracy tests performed on dosimeters with doses of 50, 200, 400, 500, 700, and 800 cGy and temperatures of 0°F and 32°F required during first article testing shall be deleted from production testing.

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4.4.2 Group B inspection. Group B inspection shall be performed on lots that have passed Group A inspection. This inspection shall consist of the inspections listed in Table III. Lots in which samples exhibit any failures shall be screened for that failure prior to the units within the lot being subject to Group C inspection.

TABLE III. Group B inspection.

Inspection	Requirement paragraph	Test paragraph
Interchangeability	3.3.4	4.11
Size and weight	3.4.1	4.11
Voltage range <u>1/</u>	3.5.4	4.5.4
Orientation	3.5.5	4.5.5

4.4.2.1 Group B sampling plans. Group B sampling shall be performed in accordance with the contract or purchase order (see 6.2.i).

4.4.3 Group C inspection. Group C inspection shall be performed on units that have passed Group A and Group B inspection. The inspection shall consist of the inspections specified in Table IV. Samples shall be selected in accordance with the contract or purchase order (see 6.2.i).

4.4.3.2 Group C failures. Action required relative to Group C failure shall be as specified in the contract (see 6.2.j).

4.4.3.3 Reinspection of conforming Group C sample units. Unless otherwise specified, sample units which have been subjected to and passed Group C inspection may be accepted on the contract provided all damage is repaired and sample units are resubjected to and pass Group A inspection, with the exception of safety engineering.

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TABLE IV. Group C inspection.

Inspection	Requirement paragraph	Test paragraph
Subgroup 1		
High temperature	3.6.1	4.6.1
Low temperature	3.6.2	4.6.2
Temperature shock	3.6.12	4.6.12
Humidity	3.6.3	4.6.3
Subgroup 2		
Altitude	3.6.4	4.6.4
Dust	3.6.9	4.6.9
Salt fog <u>1/</u> <u>2/</u>	3.6.10	4.6.10
Subgroup 3		
Vibration	3.6.7	4.6.7
Shock, transit drop	3.6.6	4.6.6
Shock, bench handling	3.6.8	4.6.8
Immersion	3.6.5	4.6.5
Fungus <u>1/</u> <u>2/</u>	3.6.11	4.6.11
Subgroup 4		
Electromagnetic interference <u>2/</u>	3.8	4.8

1/ The Radiac Set shall be thoroughly washed, cleaned, dried and refurbished after this inspection before proceeding with subsequent inspection.

2/ Shall be performed at mid-point of production contract.

4.4.4 Group D inspection. This inspection shall consist of the tests specified in Table V and shall be performed on units from lots which have been subjected to and met Group A and Group B inspection.

4.4.4.1 Group D failures. Actions relative to Group D failures shall be as specified in the contract (see 6.3.j).

4.4.4.2 Sampling for Group D inspection. Sampling for Group D inspection shall be as specified in the contract or order (see 6.2.i).

TABLE V. Group D inspection.

Inspection	Requirement paragraph	Test paragraph
Reliability	3.9	4.9

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4.4.4.3 Reinspection of conforming Group D sample units. Unless otherwise specified, sample units which have been subjected to and passed Group D inspection may be accepted on contract provided all visible and known damage is repaired and the sample units are resubjected to and pass Group A inspection.

4.5 Methods of inspection.

4.5.1 Accuracy. The DT-236/PDR-75 dosimeters exposed to 50, 100, 200, 300, 400, 600, 700, 800, and 900 cGy gamma and neutron radiation respectively, shall be read at 48 hours \pm 1 hour after exposure with a calibrated AN/PDR-75 field reader at -25°F (-32°C), 0°F (17.7°C), 32°F (0°C), 68°F, (20°C) and 125°F (+52°C). The AN/PDR-75, as a system, shall meet the accuracy requirements given in 3.5.1. The readings shall be taken within the 0-999 cGy scale range. Fifteen neutron readings shall be taken when reading each separate neutron dosed DT-236. The first 10 shall be discarded and the remaining 5 recorded and averaged. Five readings shall be taken when reading each separate gamma dosed DT-236, then recorded and averaged.

NOTE: Both reader and dosimeters shall be tested at the listed temperature.

4.5.2 Precision. A DT-236/PDR-75 shall be exposed to 500 cGy neutron and after 48 hours \pm 1 hour stabilization period shall be read twenty consecutive times on a AN/PDR-75. Failure of the readings to fall within the limits specified in 3.5.2 shall constitute failure of the test. The above shall be performed for both neutron and gamma standards.

4.5.3 Reading rate. Fifteen dosimeters shall be opened, read and resealed in 15 minutes or less (see 3.5.3).

4.5.4 Voltage range. The DT-236/PDR-75 dosimeters exposed to 50, 100, 200, 300, 400, 500, 600, 700, 800, and 900 cGy gamma and neutron radiation respectively shall be read at -25°F (-32°C) and 125°F (+52°C). The input voltage to the reader shall be set at 21 volts and 30 volts and readings taken at both temperatures (see 3.5.4). Accuracy shall be in accordance with 3.5.1.

NOTE: Both reader and dosimeters shall be tested at the listed temperatures.

4.5.4.1 Power supply transient voltage. The contractor shall set up and conduct transient voltage tests at room temperature. The AN/PDR-75 operational verification shall be conducted before and after test. Data shall be recorded of the electrical test environment and readings taken during the operational verification of the unit. The test electrical environment shall be voltage transient of 40 volts for less than 50 milliseconds or 600 volts for less than 10 microseconds (see 3.5.4.1).

4.5.5 Orientation. The dosimeters shall be read with the reader set at an angle of 20° from the normal operating position tilted back, to the front, and to both sides (see 3.5.5).

4.5.6 Burn-in. Perform the burn-in process per 3.5.6. Burn-in is required prior to the conduct of environmental testing of 4.6.

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4.6 Environmental tests. Environmental testing may be performed in accordance with the methods and procedures identified in 6.3. The contractor may develop and use an alternative, (equivalent) test plan following Government review and approval. When the contractor's test plan deviates from the recommended test procedures, the contractor shall be required to show where his own tests and methods for verifying the specified performance are equivalent. Also, measurements taken by the contractor during verification testing of all environmental requirements shall be accomplished using known testing apparatus such as an environmental test chamber, vibration test table, pendulum shock device or similar equipment for which the technical capabilities to properly simulate extreme climatic or environmental conditions are scientifically documented.

4.6.1 High temperature (storage and operation). Verify compliance with the requirement of 3.6.1. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.6.2 Low temperature. Verify compliance with the requirement of 3.6.2. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.6.3 Temperature shock. Verify compliance with the requirement of 3.6.3. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.6.4 Altitude. Verify compliance with the requirement of 3.6.4. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.6.5 Immersion. Verify compliance with the requirement of 3.6.5. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.6.6 Shock transit drop. Verify compliance with the requirement of 3.6.6. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.6.7 Vibration. Verify compliance with the requirement of 3.6.7. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.6.8 Shock, bench handling. Verify compliance with the requirement of 3.6.8. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

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4.6.9 Dust. Verify compliance with the requirement of 3.6.9. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.6.10 Salt fog. Verify compliance with the requirement of 3.6.10. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.6.11 Fungus. Verify compliance with the requirement of 3.6.11. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.6.12 Temperature shock. Verify compliance with the requirement of 3.6.12. The tests recommended in 6.3, or equivalent test methods may be used. Failure to meet the requirement shall constitute failure of the test.

4.7 Nuclear survivability. The AN/PDR-75 shall be subjected to the nuclear environment as specified in A3160505. The reader shall be energized during exposure.

4.7.1 Electromagnetic pulse (EMP). The reader shall be placed within a long wire electromagnetic pulse facility or its equivalent in the following orientations:

- a. Power cables extended parallel to the electric field and perpendicular to the magnetic field; all individual units under the long wire, but widely separated.
- b. Power cables coiled on ground; all units centrally located under the long wire. Test data to satisfy the EMP requirements in A3160505 may be assembled by extrapolation.

4.7.2 Thermal radiation. One reader shall be exposed to the thermal radiation levels specified in A3156. Since the available simulation facilities provide these thermal radiation levels only over relatively small areas, many individual exposures will be required so that each of the exposed surfaces (case, meters, knobs, cables, and other outboard components) will receive the required thermal exposure. The reader, following exposures, shall show no degradation and shall meet specified performance.

4.7.3 Nuclear air blast. The reader shall be placed in a nuclear air blast simulation facility and exposed to the air blast environment as specified in A3160505. The reader shall meet the specified performance following this test.

4.7.4 Initial nuclear radiation. The complete reader shall be exposed to a LINAC and a pulsed or fast burst reactor in such a manner that all electronic piece parts and circuits in the set receive the neutron and gamma doses and rates specified in A3160505. The reader shall meet specified performance (see 3.7.4).

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4.8 Electromagnetic interference. The reader shall be tested for compliance with the requirements of 3.8. The recommended test methods of 6.5 may be used to measure compliance.

4.9 Reliability testing.

4.9.1 First article and quality conformance Group D inspection. To determine compliance with 3.9 during first article testing and conformance inspection, the equipment shall be tested in accordance with a contractor-developed, Government approved test plan and procedure as required in the contract. The sample size shall be 5 units. Test Plan IIIC and Test Plan IVC of MIL-HDBK 781 are recommended as guidance.

4.9.2 Reliability test conditions. The test environment for the reliability test shall be under the following conditions:

- a. Electrical stress. The equipment shall be operated at nominal design input voltage for 50 percent of the time and at maximum and minimum input voltage for 25 percent of the time, respectively. The maximum and minimum voltages shall be ± 10 percent of nominal.
- b. Vibration stress. The equipment shall be vibrated 15 minutes each operating hour at 2.2, $\pm 0.22g$ peak acceleration at any non-resonant frequency between 20 and 60 Hz measured at the mounting point of the unit. Total vibration time in a 24 hour period shall be at least 4 hours, 2 hours at low temperature and 2 hours at high temperature.
- c. Thermal stress. The CP-696/PDR-75 shall be continuously operated under the following temperature cycling:

Transit	Ambient to $-25^{\circ}\text{F}(-32^{\circ}\text{C})$	1 hour
Stabilized	$-25^{\circ}\text{F}(-32^{\circ}\text{C})$	9 hours
Transit	$-25^{\circ}\text{F}(-32^{\circ}\text{C})$ to $+125^{\circ}\text{F}(+52^{\circ}\text{C})$	2 hours
Stabilized	$+125^{\circ}\text{F}(+52^{\circ}\text{C})$	9 hours
Transit	$+125^{\circ}\text{F}(+52^{\circ}\text{C})$ to ambient	1 hour
Stabilized	Ambient	2 hours

- d. Test cycle. The test cycle shall be 24 hours long.
- e. Failure definition. A failure is defined as the inability of the equipment to perform its required function. This includes any events which cause departure from performance as required by this specification and approved test procedures.

- f. Parameters to be measured. Performance parameters are to be measured and

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recorded at least once per day on each equipment during the reliability test. A complete set of measurements in accordance with paragraphs 3.5.1 and 3.5.2 shall be taken daily during both the high and low temperature stabilization.

4.10 Safety engineering inspection. A visual inspection shall be performed in the presence of a government safety representative to determine that all requirements of 3.10 have been incorporated in the equipment. Inability to meet these requirements shall constitute a failure of the test. Results of this inspection shall be included in the Safety Assessment Report, if required in the contract.

4.11 Visual and mechanical inspection. These inspections shall be performed in any order which is satisfactory to the government. The units shall be examined for defects.

5. PACKAGING

5.1 Packaging requirements. For acquisition purposes, the packaging requirements shall be as specified in the contract or purchase order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department of Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Radiac Set, AN/PDR-75 is intended to read gamma and neutron doses from Radiac Detector, DT-236/PDR-75 in the field.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification and any amendment thereto.
- b. The contractor should apply for nomenclature in accordance with the applicable clause in the contract.
- c. Marking and shipping of samples.
- d. Place of final inspection.
- e. Number of first articles to be submitted for approval (see 3.1).

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- f. Requirement for first article test plan and test report.
- g. Issue of the DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2 and 2.3).
- h. Levels of preservation and packaging (see Section 5).
- i. Handling of groups C and D failures must be specified.
- j. Groups B and D sample requirements must be stated.
- k. Specific serial numbers to be placed on the produced items.

6.3 Environmental inspection procedures. The test methods and procedures of MIL-STD-810 listed below are recommended, but not mandatory for determining compliance with the environmental requirements of this specification. The contractor may use any test method that he can verify as providing comparable stress levels on the material to be tested.

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Inspection	Spec. paragraph	MIL-STD-810 method	MIL-STD-810 procedure	Remarks
High temperature (Storage)	3.6.1	501.1	I	Storage temperature (Step 2) shall be for 6 hours duration. +160°F(+71°C)
High temperature (operation)	3.6.1	501.1	I	Operation temp (Step) shall be +125°F (+52°C) with the sight turned on for 3 hours. "Operate" (Step 5) shall be defined as the ability to observe a green glow from the eyepiece from the exterior of the chamber turn a window.
Low Temperature	3.6.2	502	I	Storage temp. of Step 2 shall be -70°F (-57°C) -23°F (-32°C) for 9 hours. Step 5 "Operate" shall be defined as the ability of all controls to operate as per this spec.
Humidity	3.6.3	507.1	III	Use 2 continued 48 hour cycles.
Altitude	3.6.4	500	I	Operate altitude chamber @40,000 feet above sea level. Operate the sight (Step 2) for 3 hours. Storage article is 10,000 for 6 hours.
Immersion	3.6.5	512.1	I	Use 30 minutes.
Shock, transit drop	3.6.6	516.2	II	Time duration: 4 milliseconds.
Vibration	3.6.7	514.2	X	-Use Curve AX.
Shock, bench handling	3.6.8	516.2	V	Their shall be no mechanical damage following the test.
Dust	3.6.9	510.1	I	
Salt fog	3.6.10	I		
Fungus	3.6.11	508.1	I	No growth colonization on 50% after 14-28 days. No more than sparse microbial growth on 10 % of the area.
Temperature shock	3.6.12	503.1	I	Use shock temperatures of -65°F (-54°C) and +145°F (+63°C).

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6.4 Definitions.

6.4.1 Damage. Damage is defined as breakage, loosening, shifting, or evidence of corrosion, or the failure of any component's connection, hardware or surface finish; leakage into the case, the degradation in input or output characteristics and any failure of the control knobs to perform their intended function.

6.4.2 "g". "g" represents the acceleration (+) or deceleration (-) caused by the force resulting from the phenomenon of gravity.

6.4.3 Exfoliation. Exfoliation is defined as corrosion occurring along the grain boundaries of metal resulting in peeling or separating of successive layers of base metal. The appearance resembles loose onion skin-like peeling.

6.5 Electromagnetic interference. Use of MIL-STD-462 is recommended for measuring compliance within 3.8.

6.6 Subject term (key word) listing.

Computer-Indicator Radiac CP-696/PDR-75
Radiac Detector DT-236/PDR-75
Case, Carrying Y-8420/PDR-75
Nuclear environments.
Measurements of neutron and gamma doses.

6.7 Changes from previous issues. Marginal notations are not used in this revision to identify changes due to the extent of the changes.

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3. DOCUMENT TITLE RADIAC SET, AN/PDR-75		
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)		
5. REASON FOR RECOMMENDATION		
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