

INCH-POUND

MIL-R-49293 (CR)

6 June 1990

SUPERSEDING

MIL-I-49422 (ER)

7 December 1981

## MILITARY SPECIFICATION

## RADIAC SET AN/PDR-75

This specification is approved for use by Communications-Electronics Command, 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 specification covers the requirements for construction and testing of the Radiac Set AN/PDR-75, which consists of:

Computer-Indicator Radiac CP-696/PDR-75  
Case, Carrying/CY-8420/PDR-75  
Cable Assemblies  
Battery Connector Case Assembly

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ED-TO, Fort Monmouth, New Jersey 07703-5000 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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## SPECIFICATIONS

## MILITARY

- MIL-P-11268 - Parts, Materials, and Processes Used in Electronic Equipment
- MIL-M-13231 - Marking of Electronic Items
- MIL-F-14072 - Finishes for Ground Electronic Equipments
- MIL-P-15024/6 - Plates, Identification, Equipment
- MIL-C-46168 - Coating, Aliphatic Polyurethane, Chemical Agent Resistant

## STANDARDS

## MILITARY

- MIL-STD-252 - Classification of Visual and Mechanical Defects for Equipment, Electronic, Wired, and Other devices
- MIL-STD-454 - Standard General Requirements for Electronic Equipment
- MIL-STD-461 - Electromagnetic Interference Characteristics, Requirements for Equipment
- MIL-STD-462 - Electromagnetic Interference Characteristics, Measurement of
- MIL-STD-471 - Maintainability Verification, Demonstration Evaluation
- MIL-STD-781 - Reliability Design Qualification and Production Acceptance Tests: Exponential Distribution
- MIL-STD-810 - Environmental Test Methods
- MIL-STD-1562 - List of Standard Microcircuits

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from: Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19120-5099.)

2.1.2 Other government documents, drawings, and publications. The following government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise

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specified, the issues shall be those in effect on the date of the solicitation.

## DRAWING

DL C5085500	- Radiac Set AN/PDR-75
DL C5085357	- Computer-Indicator Radiac CP-696/PDR-75
C5085373	- Case, Carrying CY-8420/PDR-75
DL C5085549	- Cable Assembly
DL C5085550	- Cable Assembly
DL C5085551	- Cable Assembly
C5085583	- Battery Connector Case Assembly
A3160505	- Nuclear Survivability Requirements for Detector, Radiac DT-236/PD and computer Indicator CP-696( )UD 18 March 1974
TB9-6665-286-35	- Calibration Procedure for Radiac Set AN/PDR-75

(Copies of specifications, standards, 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.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 First article. When specified (see 6.2) the contractor shall furnish first article units for first article inspection and approval (see 4.3).

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3.5.3 Serial numbers. Each CP-696/PDR-75 shall be serial numbered.

3.6 Interchangeability. Like units, subassemblies and replaceable parts shall be electrically and mechanically interchangeable and shall conform to Requirement of MIL-STD-454 (see 4.6).

3.6.1 Electrical and mechanical interchangeability demonstration test (EMIDT). The EMIDT shall be conducted to validate that the equipment possess 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 to the item of adjoining items, except for adjustment. (see 4.6.1)

3.7 Burn-in. All module of each CP-696/PDR-75 shall meet the performance requirements specified in 3.11 without subsequent processing after subsection to burn-in test of 4.7.

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

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

The external dimensions of carrying case are:

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

3.9 Safety engineering.

3.9.1 Personnel hazards. Personnel hazards shall be kept to a minimum through compliance of configuration changes and parts selection with Requirement 1 of MIL-STD-454. Compliance with these requirements will be verified through a visual inspection (see 4.13).

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

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

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3.10 Performance requirements.

3.10.1 Accuracy. The CP-696/PDR-75, when reading DT-236/PDR-75 dosimeters, shall as a system have an accuracy of  $\pm 30$  percent or  $\pm 30$  cGy, which ever is greater, at the 200 cGy level of the true dose delivered to the dosimeter at the temperature limits of  $-25^{\circ}\text{F}(-32^{\circ}\text{C})$  and  $+125^{\circ}\text{F}(+52^{\circ}\text{C})$ . The system accuracy between the 2 temperature limits shall improve such that at room temperature,  $+68^{\circ}\text{F}(+20^{\circ}\text{C})$  the accuracy shall be  $\pm 20$  percent or  $\pm 20$  cGy, which ever is greater (see 4.9.1).

3.10.2 Precision. DT-236/PDR-75's dosed to 500 cGy and read on the AN/PDR-75, field reader shall exhibit reading  $\pm 5$  percent of its own mean with a 95 percent confidence level (see 4.9.2).

3.10.3 Reading rate. The AN/PDR-75 shall be designed to allow reading at least 60 DT-236/PDR-75's per hour (see 4.9.3).

3.10.4 Voltage range. The AN/PDR-75 shall be operable between 21 to 30 volts DC (see 4.9.4).

3.10.4.1 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 (see 4.9.4.1).

3.10.5 Orientation. The AN/PDR-75 shall be operable in any orientation up to  $20^{\circ}$  from the normal operating position (see 4.9.5).

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

Requirement paragraph	Test paragraph	Measurement
3.10.1	4.9.1	Accuracy
3.10.2	4.9.2	Precision

3.11.1 High temperature.

- a. Operating. The AN/PDR-75 shall be operable without degradation in specified performance at ambient test temperature up to and including  $+125^{\circ}\text{F}(+52^{\circ}\text{C})$ . (see 4.10.1)

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- b. Storage and transportation. The AN/PDR-75 shall withstand exposure to air temperature as high as  $+160^{\circ}\text{F}(+71^{\circ}\text{C})$  (see 4.10.1).

3.11.1.1 Ambient temperature. The AN/PDR-75 shall meet the specified performance at  $68^{\circ}\text{F}(20^{\circ}\text{C}) \pm 7^{\circ}\text{F}(\pm 3.9^{\circ}\text{C})$  (see 4.10.1.1).

3.11.2 Low temperature.

- a. Operating. The AN/PDR-75 shall be operable without degradation in specified performance at temperature as low as  $-25^{\circ}\text{F}(-32^{\circ}\text{C})$ . (see 4.10.2)
- b. Storage and transportation. The AN/PDR-75 shall withstand exposure to air temperature as low as  $-70^{\circ}\text{F}(-57^{\circ}\text{C})$  (see 4.10.2).

3.11.3 Humidity. The AN/PDR-75 shall exhibit no physical damage such as corrosion, rust, blistering, swelling, or deterioration of parts and materials and shall meet the specified performance when subjected to  $94\pm 4$  percent relative humidity. The reader shall meet specified performance without degradation after completion of the test (see 4.10.3).

3.11.4 Altitude. The AN/PDR-75 shall meet the specified performance at 10,000 ft (3048m) above sea level. The reader shall meet specified performance without degradation after completion of the test (see 4.10.4).

3.11.5 Immersion. The AN/PDR-75 as prepared for field transportation shall show no evidence of leakage after being tested in accordance with 4.10.5. Leakage into the drawer compartment shall be allowed but shall not lead to a degradation in specified performance after completion of test. (see 4.10.5).

3.11.6 Shock, transit drop. The AN/PDR-75 shall in its carrying case withstand shocks encountered during operation (see 4.10.6).

3.11.7 Vibration. The AN/PDR-75 shall operate without degradation in specified performance and shall suffer no mechanical damage after being subjected to the vibration test specified in 4.10.7.

3.11.8 Shock, bench handling. The AN/PDR-75 shall operate without degradation in specified performance and shall suffer no mechanical damage after being subjected to the bench handling test specified in 4.10.8.

3.11.9 Dust. The AN/PDR-75 shall operate without degradation in specified performance after being subjected to the dust test of 4.10.9.

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3.11.10 Salt fog. After the salt fog test of 4.10.10, 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 (see 6.3). There shall also be no binding or clogging of mechanical parts. Drawer contacts should be cleaned prior to performance operation checks to ensure contact with DT-236/PDR-75.

3.11.11 Fungus. After the fungus test of 4.10.11, 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 colonies with mycelial development in areas only in other than critical 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 4.10.11. Materials used in the manufacture, fabrication, construction and treatment of the AN/PDR-75 shall comply with Requirement 4 of MIL-STD-454.

3.11.12 Temperature shock. The equipment shall be capable of withstanding temperature shocks between  $-65^{\circ}\text{F}$  ( $-54^{\circ}\text{C}$ ) and  $+145^{\circ}\text{F}$  ( $+63^{\circ}\text{C}$ ) (see 4.10.12).

3.11.13 Nuclear survivability. The AN/PDR-75 shall meet the specified performance after being subjected to the nuclear environment of 4.10.13.

3.12 Electromagnetic interferences. The AN/PDR-75 shall meet the following emission and susceptibility requirements of MIL-STD-461, Notice 4. (see 4.11).

CE01 (1)	CS01	RE02	RS03 (4)
CE02 (1)	CS02 (2)	RE02.1 (3)	RS03.1 (4)
CE04 (1)	CS06		

1. The power supply switching frequency and its harmonics below 267 KHz are allowed to exceed the limit by a maximum of 10 db.

2. The injected interfering signal shall be 1 KHz, 50% AM.

3. The power supply switching frequency and its second and third harmonics are allowed to exceed the limit by a maximum of 20 db.

4. The frequency range of test shall be 10 KHz to 10 GHz with the equipment immersed in the following radiated electric fields.

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<u>Frequency range</u>	<u>Field intensities</u>	<u>Modulation characteristics</u>
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	" "

All electromagnetic interference (EMI) tests shall be performed for both AC 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  $\pm 20$  cGy is allowable.

3.12.1 Bonds and grounds. Bonding for equipment current path returns, RF potentials and shock hazards shall be so installed that expansion, contraction, or movement incident to normal service use and maintenance will not break or loosen the connection. 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 in accordance with MIL-F-14072. The DC resistance of bonds and grounds shall not exceed 25.0 milliohms.

3.12.3 Cables and connectors. Shielded cables, when required, shall have a shield weave providing not less than ninety percent coverage. The shield shall be constructed of braided, tinned copper wire. All shielded cables shall have the shield terminated in an approved military connector with an EMI back shell to provide peripheral bonding of shield. The use of shielded cables shall be kept to a minimum by the use of alternative suppression techniques such as pin filters. All panel mounted connectors and components and the panel mating surfaces shall have a RF conductive finish and provide positive bonding and grounding with mating connectors and equipment ground plane. The DC bonding resistance for all connectors and panel mounted components shall not exceed 25.0 milliohms.

3.13 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 (see 4.12). The reliability requirements shall be demonstrated in accordance with MIL-STD-781 when operating under the following conditions:

- a. Operating temperature:  $-25^{\circ}\text{F}$  to  $+125^{\circ}\text{F}$   
( $-32^{\circ}\text{C}$  to  $+52^{\circ}\text{C}$ )
- b. Environment: ground mobile
- c. Duty cycle: 100 percent

3.14 Workmanship. The Radiac Set AN/PDR-75 shall be manufactured and assembled in accordance with Requirement 9 of MIL-STD-454 and the applicable portions of MIL-P-11268.



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## 4.0 QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, or purchase order the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the government. The government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the government to acceptance of defective material.

4.1.2 Calibration of field reader AN/PDR-75. The contractor shall perform calibration as described in TB9-6665-286-35 of the Field Reader, AN/PDR-75, as required in paragraph 3.3.2 prior to operating unit before and after the conduction of 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). Does not include packaging.
- b. Inspections covered by subsidiary documents (see 4.4).
- c. Quality conformance inspection of equipment before packaging (see 4.5).

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.

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TABLE I. First article inspection.

Inspections	Req't para	Test para	Order of tests 2/					
			unit 1	unit 2	unit 3	units 4-7	units 8-12	
1. Inspections covered by subsidiary documents 1/	3.3 3.5	4.4 3.4 3.14	Inspection to be performed on all units					
2. Burn-In 1/	3.7	4.7	Inspection to be performed on all units					
3. Group A inspection 1/	See table II		Inspection to be performed on all units					
4. Group B inspection 1/	See table III		Inspection to be performed on all units					
5. Group C inspection								
Ambient temperature 4/	3.11.1.1	4.10.1.1						
High temperature	3.11.1	4.10.1	1					
Low temperature	3.11.2	4.10.2	2					
Humidity	3.11.3	4.10.3	4					
Immersion	3.11.5	4.10.5		3				
Dust	3.11.9	4.10.9		2				
Vibration	3.11.7	4.10.7			1			
Shock, transit drop	3.11.6	4.10.6				2		
Shock, bench handling	3.11.8	4.10.8					3	
Salt fog	3.11.10	4.10.10			4			
Fungus	3.11.11	4.10.11					4	
Altitude	3.11.4	4.10.4		1				
Temperature shock	3.11.12	4.10.12	3					
6. Unique first article tests								
Transient voltage 4/	3.10.4.1	4.9.4.1						
Reading rate 3/	3.10.3	4.9.3					1	
Orientation	3.10.5	4.9.5					2	
Nuclear survivability	3.11.13	4.10.13						
Nuclear air blast	3.11.13	4.10.13.3						Unit 4
Thermal radiation	3.11.13	4.10.13.2						Unit 5
Electromagnetic pulse	3.11.13	4.10.13.1						Unit 6
Initial nuclear radiation	3.11.13	4.10.13.4						Unit 6
Electromagnetic Interference	3.12	4.11						Unit 7
7. Group D Reliability	3.13	4.12						1

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- 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.
- 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 First article data. The first article test plan and test report(s) shall be as required in the contract.

4.4 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.

Item	Where required
Parts, materials, and processes; general	3.3
Finish	3.4
Nameplate and marking	3.5
Workmanship	3.14

4.5 Quality conformance inspection of equipment before packaging. The contractor shall perform the inspections specified in 4.4, 4.5.1 through 4.5.4 and 4.7. 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.

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4.5.1 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 in accordance with Table III. Lots in which samples exhibit any failure shall be screened for that failure prior to being subjected to group A inspection.

4.5.1.1 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	Equipment paragraph	Test paragraph
Accuracy 1/ 2/	3.10.1	4.9.1
Precision	3.10.2	4.9.2
Visual and mechanical	3.1	4.14
Safety engineering	3.9	4.13

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.

TABLE III - Sampling plan for accuracy - precision visual and mechanical - safety engineering - voltage range

<u>Lot size</u>	<u>Sample size</u>
2 to 8	1/
9 to 15	13
16 to 25	13
26 to 50	13
51 to 90	13
91 to 150	13
151 to 280	13
281 to 500	20
501 to 1200	34
1201 to 3200	42
3201 to 10,000	50
10,001 to 35,000	60
35,001 to 150,000	74
150,001 to 500,000	90
500,001 and over	102

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## NOTES:

1. 1/ Indicates entire lot must be inspected.
2. Acceptance number in all cases is zero.

4.5.2 Group B inspection. Group B inspection shall be performed on lots that have passed group A inspection. This inspection shall consist of the inspection listed in table IV. Each lot shall be subjected to sampling inspection in accordance with table V and VI. 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 IV group B inspection

Inspection	Equipment paragraph	Test paragraph
Interchangeability	3.6	4.6
Size and weight	3.8	4.8
Voltage range 1/	3.10.4	4.9.4
Orientation	3.10.5	4.9.5

1/ Sampling plan for voltage range - see table III.

4.5.2.1 Group B sampling plans. The group B shall be performed in an order satisfactory to the government.

TABLE V - Sampling plan for interchangeability

Lot size	Sample size
2 to 8	2
16 to 15	2
16 to 25	3
26 to 50	5
51 to 90	5
91 to 150	6
151 to 280	7
281 to 500	9
501 to 1200	11
1201 to 3200	13
3201 and over	15

NOTE: Acceptance number in all cases is zero.

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TABLE VI. - Sampling plan for size and weight

<u>Lot size</u>	<u>Sample size</u>
2 to 8	3
9 to 15	3
16 to 25	3
26 to 50	5
51 to 90	6
91 to 150	7
151 to 280	10
281 to 500	11
501 to 1200	15
1201 to 3200	18
3201 to 10,000	22
10,001 and over	29

NOTE: Acceptance number in all cases is zero.

4.5.3 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 VII. Samples shall be selected in accordance with 4.5.3.1.

4.5.3.1 Sampling for group C inspection. Four units shall be selected at random, from the first 400 production models, one sample for each subgroup in table IV. Those units shall constitute the group C requirement for the first 400 units produced. Thereafter, 3 units shall be selected at random, one sample for each for subgroups 1, 2, and 3 in table VII, from every 400 units or fraction therefore produced. If the quantity of the last fraction produced consist of less than 200 units, no group C inspection shall be required. The sample units shall be selected from the conformance lots consisting of units from each 400 units or fraction thereof produced. The salt fog, fungus inspections shall be performed at the mid-point of the production contract.

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4.5.3.2 Group C failures. Action required relative to group C failure shall be as specified in the contract.

4.5.3.3 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 the sample units are resubjected to and pass group A inspection, with the exception of safety engineering.

TABLE VII. Group C inspection.

Inspection	Requirement paragraph	Test paragraph
Subgroup 1		
Ambient temperature	3.11.1.1	4.10.1.1
High temperature	3.11.1	4.10.1
Low temperature	3.11.2	4.10.2
Temperature shock	3.11.12	4.10.12
Humidity	3.11.3	4.10.3
Subgroup 2		
Altitude	3.11.4	4.10.4
Dust	3.11.9	4.10.9
Salt fog 1/ 2/	3.11.10	4.10.10
Subgroup 3		
Vibration	3.11.7	4.10.7
Shock, transit drop	3.11.6	4.10.6
Bench handling	3.11.8	4.10.8
Immersion	3.11.5	4.10.5
Fungus 1/ 2/	3.11.11	4.10.11
Subgroup 4		
Electromagnetic interferences 2/	3.12	4.11

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- 1/ The equipment 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.

4.5.4 Group D inspection. This inspection shall consist of the tests specified in table VIII and shall be performed on units from lots which have been subjected to and met group A and group B inspection.

4.5.4.1 Sampling for group D inspection. Five units shall be selected at random from the first 400 units or fraction thereof and subjected to the test of 4.12. The sample units shall be selected from the first quality conformance lot consisting of units from each 400 units or fraction thereof produced. If the quantity of the last fraction produced consists of less than 200 units, the selection group D samples for the preceding test shall include units from the remaining fraction.

4.5.4.2 Group D failures. Actions relative to group D failures shall be as specified in the contract.

TABLE VIII Group D inspection.

Inspection	Requirement paragraph	Test paragraph
Reliability	3.13	4.12

4.5.4.3 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.

4.6 Interchangeability. The dimensions listed below shall be gaged or measured to determine conformance to the physical interchangeability requirement of 3.6. When a listed dimension is not within specified or design limits, it shall be considered a major defect.

- a. External and internal dimensions of cases, covers, and insertable assemblies, when such dimensions affect mating of parts.
- b. Dimensions of cavities, when such dimensions affect insertion of items.
- c. Location of hinges and fasteners on separable parts or assemblies which must mate, such as cases, covers, and mountings.



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- d. Location of connectors, locking pins, fasteners, slides, and mountings which receive mating parts of plug-in assemblies and major units, and location of the mating parts on the plug-in assembly or major unit.
- e. Size and form of special threads.

4.6.1 Electrical and mechanical interchangeability demonstration test (EMIDT).

- a. Electrical Modules - An EMIDT shall be performed to validate system performance requirements of the following AN/PDR-75 modules:
  - 1. Amplifier cord
  - 2. Power supply
  - 3. EHT supply unit
  - 4. Flash unit
  - 5. Photo cell

The tests will be performed on all first article test units by interchanging modules, considering all possible combinations, and recording test data while operating at ambient temperature. The units shall be operated in a normal mode using a calibrated set of lockets. Recalibration of units is permitted after each module exchange.

- b. Hardware items - The EMIDT requires the sequential exchange and operation of the hardware listed below:

Cable No. 1	C5085549
Cable No. 2	C5085550
Cable No. 3	C5085551
Drawer assembly	C5085367

4.7 Burn-in. Each CP-696/UD shall be operated for a minimum of 24 hours under the test conditions specified in 4.12. The burn-in shall be concluded by a failure free period, the duration of which shall be 12 hours. Equipment performance shall be monitored as specified in 4.12 (see 3.7).

4.8 Size and weight.

4.8.1 Size. The size of the AN/PDR-75 and carrying case shall be measured. It shall meet the requirements of 3.8.

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4.8.2 Weight. The Radiac Set AN/PDR-75 shall be weighed. The total weight shall not exceed that given in 3.8.

4.9 Performance tests.

4.9.1 Accuracy. The DT-236/PDR-75 dosimeters exposed to 50, 100, 200, 300, 400, 600, 700, 800, and 900cGy gamma and neutron respectively, shall be read at 48 hours  $\pm$ 1 hour after exposure with a calibrated AN/PDR-75 field reader at  $-25^{\circ}\text{F}$  ( $-32^{\circ}\text{C}$ ),  $0^{\circ}\text{F}$  ( $17.7^{\circ}\text{C}$ ),  $32^{\circ}\text{F}$  ( $0^{\circ}\text{C}$ ),  $68^{\circ}\text{F}$ , ( $20^{\circ}\text{C}$ ) and  $125^{\circ}\text{F}$  ( $+52^{\circ}\text{C}$ ). The AN/PDR-75 as a system and shall meet the accuracy requirements given in 3.10.1 subjected to the readings being within the scale range 0-999 cGy. 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 reading shall be taken when reading each separate gamma dosed DT-236, recorded and averaged.

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

4.9.2 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 AN/PDR-75. Reading shall be within the limits specified in 3.10.2. The above shall be performed for both neutron and gamma standards.

4.9.3 Reading rate. Fifteen dosimeters shall be opened, read and resealed in 15 minutes or less (see 3.10.3).

4.9.4 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 respectively shall be read at  $-25^{\circ}\text{F}$  ( $-32^{\circ}\text{C}$ ) and  $125^{\circ}\text{F}$  ( $+52^{\circ}\text{C}$ ). The input voltage to the reader shall be set at 21 volts and 30 volts and readings taken at both temperatures. Accuracy shall be in accordance with 3.10.1 (see 3.10.4). Note: Both reader and dosimeters shall be tested at the listed temperatures.

4.9.4.1 Power supply transient voltage. Contractor shall set up and conduct transient voltage test 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 a voltage transient of 40 volts for less than 50 milliseconds or 600 volts for less than 10 microseconds (see 3.10.4.1).

4.9.5 Orientation. The dosimeters shall be read with the reader set at an angle of  $20^{\circ}$  from the normal operating position tilted back, front, and to both sides (see 3.10.5).

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4.10 Service conditions. The service condition tests shall be performed as detailed below. Each AN/PDR-75 subjected to these tests shall have passed group A and B tests and shall be resubmitted to and pass the group A tests with the exception of safety engineering inspection after completion of all service condition tests. Where operation of the test items required during any service condition test, the test item shall be required to pass the specified performance.

4.10.1 High temperature. The AN/PDR-75 shall be subjected to the test of Method 501.1, Procedure II of MIL-STD-810. The storage temperature (Step 1) shall be 160°F (71°C). In Step 7, the operating temperature shall be 125°F (+52°C) (see 3.11.1).

4.10.1.1 Ambient temperature. The AN/PDR-75 shall be subjected to test methods defined in the inspection paragraphs contained in paragraph 4.10.1.1. The ambient temperature shall be +68°F (+20°C) to 70°F (3.9°C). (see 3.11.1.1)

4.10.2 Low temperature. The AN/PDR-75 shall be subjected to the test of Method 502.1, Procedure I of MIL-STD-810. The storage temperature (Step 2) shall be -70°F (-57°C) and shall be maintained for a period of not less than 2 hours following stabilization of the test item. Low operating temperature (Step 4) shall be -25°F (-32°C) (see 3.11.2).

4.10.3 Humidity. The AN/PDR-75 shall be subjected to the test of Method 507.1, Procedure III of MIL-STD-810. In Step 6, measurements shall be taken during the last 5 hours of the last cycle (see 3.11.3).

4.10.4 Altitude. The AN/PDR-75 shall be subjected to the test of Method 500.1, Procedure I of MIL-STD-810. The equipment shall be held at 0,000 feet (12192m) non-operating for one hour. The operating altitude in Step 2 shall be 10,000 feet (3,048m) (see 3.11.4).

4.10.5 Immersion. The AN/PDR-75 shall be subjected to the test of Method 512.1, Procedure I of MIL-STD-810 (see 3.11.5).

4.10.6 Shock, transit drop. The AN/PDR-75 in its carrying case shall be subjected to the test of Method 516.2, Procedure II of MIL-STD-810.

4.10.7 Vibration. The AN/PDR-75 not in the carrying case shall be subjected to the test of Method 514.2, Procedure X, Curve AX of MIL-STD-810 (see 3.11.7).

4.10.8 Shock, bench handling. The AN/PDR-75 shall be subjected to the test of Method 516.2, Procedure V of MIL-STD-810 (see 3.11.8).

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4.10.9 Dust. The AN/PDR-75 shall be subjected to the test of Method 510.1, Procedure I of MIL-STD-810 (see 3.11.9).

4.10.10 Salt fog. The AN/PDR-75 shall be subjected to the test of Method 509.1, Procedure I of MIL-STD-810 (see 3.11.10).

4.10.11 Fungus. The AN/PDR-75 as prepared for operation, shall be subjected to the test of Method 508.1, Procedure I of MIL-STD-810. 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 3.11.11).

4.10.12 Temperature shock. Each equipment shall be subjected to test Method 503.1, Procedure I of MIL-STD-810 except that the high temperature shall be +145°F (63°C) (see 3.11.12).

4.10.13 Nuclear survivability. The AN/PDR-75 shall be subjected to the nuclear environment as specified in A3160505. The reader shall be energized during exposure (see 3.11.13).

4.10.13.1 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 (see 3.11.13).

4.10.13.2 Thermal radiation. One reader shall be exposed to the thermal radiation levels specified in A3160505. 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 outboarded components) will receive the required thermal exposure. The reader, following exposures, shall show no degradation and shall meet specified performance (see 3.11.13).

4.10.13.3 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 (see 3.11.13).

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4.10.13.4 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 3.11.13).

4.11 Electromagnetic interference. The reader shall be tested for compliance with the requirements of 3.12, using the approved test methods of MIL-STD-462.

4.12 Reliability testing.

4.12.1 First article and quality conformance group D inspection. To determine compliance with 3.13 during first article testing, the equipment shall be tested in accordance with test plan IIIC of MIL-STD-781. To determine compliance with 3.13 during quality conformance inspection, the equipment shall be tested in accordance with test plan IVC of MIL-STD-781. The equipment shall be tested in accordance with MIL-STD-781 and the government approved test plan and procedure as required in the contract. The sample size shall be 5 units.

4.12.2 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  $\pm 10$  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

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- 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 causes departure from performance as required by this specification and approved test procedures.
- f. Parameters to be measured. Performance parameters are to be measured and recorded at least once per day on each equipment during the reliability test in accordance with paragraph 5.5.3 of MIL-STD-781. A complete set of measurements in accordance with paragraphs 3.10.1 and 3.10.2 shall be taken daily during both the high and low temperature stabilization.

4.13 Safety engineering inspection. A visual inspection shall be performed in the presence of a government safety representative to determine that all requirements of 3.9 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.

4.14 Visual and mechanical inspection. These inspections shall be performed in any order which is satisfactory to the government. The units shall be examined for the applicable defects listed in MIL-STD-252 (see 3.9).

## 5. PACKAGING

5.1 Packaging requirements. The packaging requirements for the desired level(s) of protection shall be as specified by the acquisition 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.

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- d. Place of final inspection.
- e. Number of first articles to be submitted for approval (see 3.1).

6.3 Definitions. Exfoliation is corrosion along the grain boundaries of the metal resulting in the peeling or separating, or both, of successive layers of the metal. The appearance resembles loose book pages or onion skin peeling.

6.4 Subject terms (keywords) list.

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.

This specification is certified to be in compliance with current Army Materiel Command (AMC) policy for the elimination of AQL's/LTPD's (Acceptable Quality Levels/Lot Tolerance Percent Defective) from military specifications.

Custodian:  
Army-CR

Preparing activity:  
Army - CR  
Project 6665-A511

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

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1. RECOMMEND A CHANGE:-		1. DOCUMENT NUMBER MIL-R-49293(CR)	2. DOCUMENT DATE (YYMMDD) 6 June 1990
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			
6. SUBMITTER			
a. NAME (Last, First, Middle Initial)		b. ORGANIZATION	
c. ADDRESS (include Zip Code)		d. TELEPHONE (include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY			
a. NAME U. S. ARMY CECOM		b. TELEPHONE (include Area Code) (1) Commercial (2) AUTOVON	
c. ADDRESS (include Zip Code) AMSEL-ED-TO FORT MONMOUTH, NJ 07703-5000		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	