AN/PDR-77 Radiac Set:
Choosing the Proper Probe

FACT SHEET 26-007-0616

Note: the following fact sheet provides guidance on selecting the most appropriate probe to use with the AN/PDR-77 Radiac given various scenarios. This fact sheet will not train you on the proper use of the AN/PDR-77.

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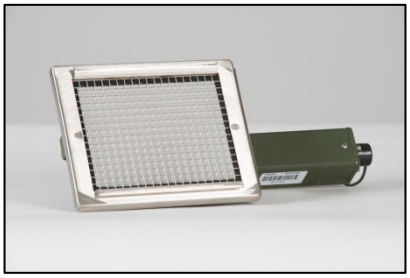
The AN/PDR-77 Radiac Set is a multipurpose radiation detection system. Its versatile, rugged design makes it ideal for nuclear accident and incident response. The meter, alpha probe, beta/gamma probe, and x-ray probe are the four major components of the AN/PDR-77. However, the capabilities of the PDR-77 may be augmented by the Radiation Protection Officer (RPO) Kit, which contains the micro-R probe and the pancake probe.

AN/PDR-77 Radiac with Beta/Gamma (β/γ) Probe (DT-616)

AN/PDR-77 Standard Probes

X-ray Probe (DT-674)



Alpha (α) Probe (DT-669)

Beta/Gamma (β/γ) Probe (DT-616)

AN/PDR-77 RPO Kit

Pancake Probe (DT-695)

micro-R Probe (DT-696)

Army Public Health Center (Provisional)
Health Physics Program
5158 Blackhawk Road, Aberdeen Proving Ground, Maryland 21010-5403
410-436-3502 or DSN 584-3502

Probe Selection Table

Measuring Objective		Probe Type				
		β/γ Probe	**α Probe**	**X-ray Probe**	**Pancake Probe**	**micro-R Probe**
		Alpha Emitters				
	Detection or Measurement[1]	C (Open Window)	A	B[4]	A	C
	Locate Missing Source[2]	C (Open Window)	C	A	A	C
		Beta Emitters				
	All Types	B (Open Window)	U	B[4]	A	C
		Gamma Emitters				
	Detection or Measurement	A	U	A	A	A
	Locate Missing Source	A	U	A	A	A
	Basic External Radiation Dose Measurement Survey[3]	A	U	U	U	B[4]
		Unknown sources				
	Detection or Measurement	B	U	B[4]	A	B[4]

A = First Choice; B = Second Choice; C = Use If No Other Probes Are Available; U = Unacceptable

1. Determine the presence or intensity of radation.
2. Find a radioactive source.
3. Determine ambient radiation doses and dose rates in a given area.
4. Most alpha and beta emitters have associated gamma rays and/or x rays. Therefore, these probes can be used to detect the presence of many alpha and beta emitters. If there are no assoicated gamma rays or x rays emitted, then these probes will not detect the radioactive material.

Probe Considerations and Limitations

- The AN/PDR-77 does not have the ability to detect neutrons.
- The alpha probe responds to alpha particles above 3 MeV.
- On the X-ray probe, the 17 keV channel has lower and upper discriminators of 12.5 keV and 21.5 keV, respectively, the 60 keV channel has settings of 50 keV and 70 keV, and the “PEAK ALIGN” channel has settings of 70 keV and 95 keV.
- Despite the display, the beta/gamma probe is calibrated in mrad/hr.
- The beta/gamma probe is compensated to provide a tissue dose response; the response begins to fall off at energies below 100 keV.
- The difference in dose rate between the beta/gamma probe’s two positions (window open and window closed) does not yield the beta dose rate.
- The pancake probe entrance window effectively blocks beta particles with energies less than about 35 keV and alpha particles with energies less than 4 MeV.
- The response of the micro-R probe is highly dependent on photon energy. See response curve in the technical manual for more information.
- The micro-R probe is useful as a radiation detector, but not as a dose meter.