

# ANSI N42.17A-1989 TEST RESULTS

## MODEL 12-4 NEUTRON SURVEY METER

### TEST NOTES

- Test groups included five or more instrument sets.
- NT = Not Tested
- N/A = Not Applicable

### GENERAL CHARACTERISTICS

Characteristics Under Test	Range of Values of Influence Quantities	Limits of Variation	Pass / Fail
AC Power	102-132 VAC 178-238 VAC	Reading cannot vary by more than plus or minus 5%	N/A
Battery Power	0 - 100 hours	Reading cannot vary by more than plus or minus 10%	NT
Battery Power Indicator	Test performed at the voltage that triggers the battery failure indication	Reading cannot vary by more than plus or minus 10%	Pass
AC powered instrument with battery backup	Instrument must be marked for battery endpoint		N/A
	Test performed at the voltage that triggers the battery failure indication	Readings cannot vary by more than plus or minus 10%	N/A

### ELECTRONIC AND MECHANICAL TESTS

Characteristics Under Test	Range of Values of Influence Quantities	Limits of Variation	Pass / Fail
Check Circuits	Per manufacturer's recommendations		
Alarms (reset)	Dose rate to activate alarm	See section 5.2.1	N/A
Alarms (delay)	Dose rate to activate alarm	Alarm must be indicated within 1 - 60 seconds	N/A
Alarm (threshold drift)	Dose rate to activate alarm	Alarm setpoint must not drift more than plus or minus 10% over a 500 hour period	N/A
Stability	3 hours (battery powered instruments)	Reading cannot change by more than plus or minus 6%	Pass

<b>Stability</b>	24 hours (AC powered instruments)	Reading cannot change by more than plus or minus 6%	N/A
	500 hours (AC powered instruments)	Reading cannot change by more than plus or minus 15%	N/A
<b>Geotropism</b>	Tested in three mutually perpendicular orientations	Reading cannot vary by more than plus or minus 6%	NT
<b>Response Time</b>	See Table 1 of Standard	See Table 1 of Standard	NT
<b>Coefficient of Variation</b>	Greater than or equal to 1 mR/h, 1 mrd/h, 10 mrem/h, 2000 dpm	Reading cannot change by more than plus or minus 10%	Pass
	Less than or equal to 1 mR/h, 1 mrd/h, 10 mrem/h, 2000 dpm	Reading cannot change by more than plus or minus 15%	Pass*
<b>Line Noise Susceptibility</b>	See table 2 of standard	Reading cannot change by more than plus or minus 15%	N/A

### RADIATION RESPONSE

<b>Characteristics Under Test</b>	<b>Range of Values of Influence Quantities</b>	<b>Limits of Variation</b>	<b>Pass / Fail</b>
<b>Accuracy (photon dose rate)</b>	0.1 mrd/h - 1000 rd/h	Cannot vary by more than plus or minus 15% of conventionally true value	NT
<b>Accuracy (count rate and contamination monitors)</b>	50 dpm/square cm to 100,000 dpm/square cm	Cannot vary by more than plus or minus 15% of conventionally true value	NT
<b>Accuracy (beta or neutron dose rate)</b>	0.1 mrem/h - 1000 rem/h	Cannot vary by more than plus or minus 15% of conventionally true value	NT
<b>Probe surface sensitivity</b>	Stated by manufacturer		NT
<b>Photon energy dependence</b>	80 keV - 1.25 MeV	See equation in section 6.3 of standard	NT
	20 keV - 3.0 MeV		NT
<b>Beta Energy Dependence</b>	0.5 MeV - 3.5 MeV (E <sub>max</sub> )	See equation in section 6.3 of standard	NT
	0.2 MeV - 3.5 MeV (E <sub>max</sub> )		NT
<b>Neutron Energy Dependence</b>	0.025 eV - 14 MeV	See equation in section 6.3 of standard	NT
<b>Photon Radiation Overload</b>	100X upper limit less than or equal to 10 rd/h	Correct response within 2 minutes	NT
	10X upper limit greater than 10 rd/h		NT
<b>Angular Dependence</b>	0 - 45 degrees (photon)	Instrument reading must not vary by more than plus or minus 20%	NT
	45 - 90 degrees		NT

0 - 45 degrees (beta)	by more than plus or minus 50%	NT
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### INTERFERING RESPONSE

Characteristics Under Test	Range of Values of Influence Quantities	Limits of Variation	Pass / Fail
<b>Extracameral Response</b>	Range of instrument	Reading cannot change by more than plus or minus 5%	NT
<b>RF Fields</b>	Per user requirements	Readings cannot change by more than plus or minus 15%	NT
	100 V/m, 0.3 - 35 MHz		NT
	100 V/m at approx. 140 MHz		NT
<b>Microwave Fields</b>	Per user requirements		NT
	100 W/square meter at 915 MHz, 2450 MHz		NT
<b>Electric Fields</b>	5000 V/m		NT
	100 V/m at 60 Hz, 400 Hz		NT
<b>Magnetic Fields</b>	800 A/m	Pass	
<b>Interfering Radiation</b>	See Table 3 of Standard		NT

### ENVIRONMENTAL FACTORS

Characteristics Under Test	Range of Values of Influence Quantities	Limits of Variation	Pass / Fail
<b>Temperature</b>	0 to 40 degrees C	Reading cannot vary by more than plus or minus 15% of reading at 22 degrees C	Pass
	-10 to +50 degrees C	Reading cannot vary by more than plus or minus 20% of reading at 22 degrees C	Pass
	10 to 35 degrees C	Reading cannot vary by more than plus or minus 15% of reading at 22 degrees C	Pass
<b>Temperature Shock</b>	From -10% to 22 degrees C		Pass
	From 50 to 22 degrees C		Pass
<b>Humidity</b>	40 to 90% RH at 22 degrees C	Readings cannot vary by more than plus or minus 15% of the reading at 40% RH	Pass
<b>Mechanical Shock</b>	50 g acceleration of 18 ms, half sine wave, test on 3 orthogonal axes (10 times)	Reading cannot vary by more than plus or minus 15%	NT
<b>Vibration</b>	2 g acc., 10 - 33 Hz, test on 3 orthogonal axes for 15 min.		NT
<b>Ambient Pressure</b>	70 - 106 kPa		Pass

<b>Splashproof</b>	2 min. fine spray (4 L/min at 2 meters from nozzle)	Pass
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\*Due to the relationship of the response time and the coefficient of variation, readings on the lowest scale were taken using SLOW response time (manufacturer's suggestion).



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