CANBERRA

GM End Window Detectors

Features

- 1.8 to 2.2 mg/cm^2 Ultra Thin Mica Window
- 19.8 or 28.4 mm effective diameter
- High alpha, beta and gamma efficiency
- Cost effective, easy to use and very reliable with unmatched quality/cost ratio

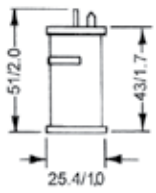
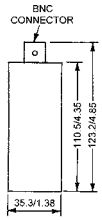
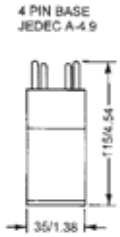
- **Our Warranty:** CANBERRA warrants that its Geiger Mueller detectors will be free from defects in materials and workmanship for a period of one (1) year from the date of initial shipment.

Description

Our GM End Window detectors provides direct-replacement to most widely used competitive detectors. These can be incorporated into various radiation monitors and dosimeters. Our GM End Window detectors are offered in two diameters: either 19.8 mm (0.78 in.) or 28.4 mm (1.12 in.). These are used in CANBERRA's own line of products as well as products from various companies. Please contact us should you wish to discuss specific requirements or references.

C37533 4/10 Printed in U.S.A.

GM End Window Detectors

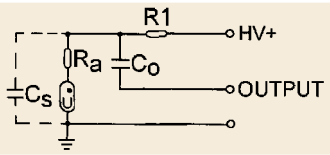
	Mica End Window			
	For α, β, γ Applications			
	 Mil. Version 2121 M Window 2.8–3.4 mg/cm^2		 Probe contains 2131 detector. Available with BNC.	
Detector Type → Characteristics ↓	**T2121**	**TP2121S**	**TP2131**	**T2131/4P**
Application	α, β, γ	α, β, γ	α, β, γ	α, β, γ
Sensitivity* ^{137}Cs cpm at 1 mR/h*	1700	1700	2400	2400
Window Area Density (mg/cm^2)	1.8–2.2	1.8–2.2	1.8–2.0	1.8–2.0
Window Effective Diameter (mm, in.)	19.8, 0.78	19.8, 0.78	28.4, 1.12	28.4, 1.12
Recommended Operating Voltage (HV+)	500	500	900	900
Plateau Length Volts min.	450–700	850–1000	850-1000	850–1000
Plateau Slope (%100 V max.)	5	5	10	10
Dead Time (µs max.)	100	100	150	150
Background (cpm) Shielding 2" Pb + 1/8" Al	30 max.	30 max.	40 max.	40 max.
Resistor Ra (MΩ)	3.3	1.0	1.0	1.0
Resistor R1 (MΩ)	1.0	1.0	1.0	1.0
Operating Temp. (°C)	–40 to +75	–40 to +75	–40 to +75	–40 to +75
Cathode Material	Cr/Fe	Cr/Fe	Cr/Fe	Cr/Fe
Max. Overall Length including Pins (mm, in.)	51.0, 2.0	94, 3.7	124, 4.85	115, 54
Max. Overall Diameter (mm, in.)	25.4, 1.0	82, 3.22	35–1.38	35, 1.38
Window Recess (mm, in.)	1.6, 0.062	1.6, 0.062	1.6, 0.062	1.3, 0.05

*At recommended operating voltage.

GM End Window Detectors

Test Circuits

Use HV+, R_a and R1 from the chart.

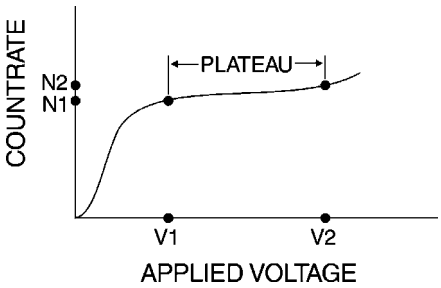


Cs = Stray capacitance typically < 1 pF.
Co = High voltage blocking capacitor.

Test Circuit – Anode Output

Plateau Calculations

Plateau slope calculations for CANBERRA data sheets are based upon IEC recommended formulae, as prescribed in the ISO affiliated publication #151-25 part 25, "Methods of measurement of Geiger Mueller counter detectors".



$$\frac{N2-N1}{1/2(N1+N2)} \times \frac{100}{V1-V2} = \%\ \text{per volt}$$

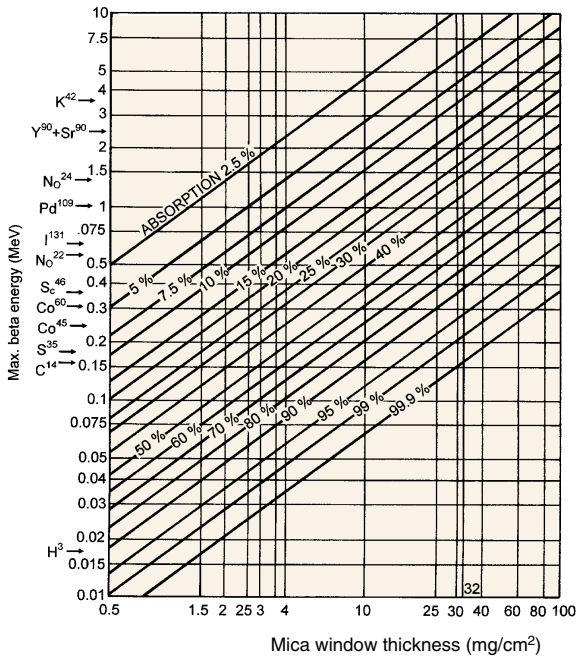
Alpha Particle Detection

The table below shows the initial energy required to penetrate a given mica window thickness. This assumes a negligible air gap between the source and the window. Note the range of alpha particles of various energies in air at atmospheric pressure.

Mica Window	α Energy	α Range in Air
1.0 mg/cm²	1.9 MeV	10 mm
2.0 mg/cm²	2.6 MeV	15 mm
3.0 mg/cm²	3.6 MeV	22 mm
4.0 mg/cm²	4.5 MeV	29 mm

Beta Particle Detection

The chart below shows the effects of mica window thickness (mg/cm²) on beta particle absorption percentage.



Dead Time Correction

GM detectors using conventional counting circuitry all exhibit counting losses due to the Dead Time factor. The chart below enables the user to estimate the counting losses due to the Dead Time factor at high count rates.

$$\frac{n}{m} = \frac{1}{1 - m\tau}$$

n = "True" Counting Rate
m = measured Counting Rate
τ = Dead Time (microseconds)

GM End Window Detectors

	CANBERRA	Centronics	LND	Saint Gobain
Mica End Window Detectors	T2121	ZP1410	7224	N/A
	T2131	N/A	723	N210-1
	TP2131	N/A	7232	N210/BNC

APPLICATIONS

Detector Type	Applications
T2121M	Military
TP2131	Radiation monitors with BNC connection
T2131-4P	Radiation monitors with 4 pin JEDEC connection

Note:

Detector probes prefix TP fitted with BNC connectors, are also available with MHV connectors if requested.

For cable ready units TP2121S, TP2131, and T2131-4P models, Ra (1.0 M) is internally connected inside the aluminum casing as shown in the assembly drawing.

Specifications

ORDERING INFORMATION

- GMT2121 – T2121.
- 48117 – TP2121.
- 46410 – TP2131.
- 48182 – T2131-4P.

ISO 9001 SYSTEM CERTIFIED