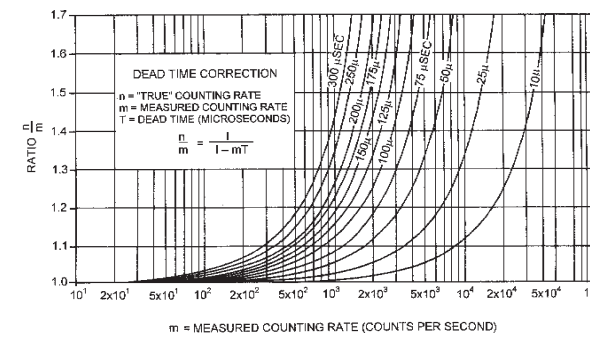


Geiger Mueller Tubes

Dead Time Correction

GM tubes using conventional counting circuitry all exhibit counting losses due to the dead time factor, T. The factors cited in the Canberra tube data tables are based on the recommended operating voltages and test circuits. The chart below enables the user to estimate the counting losses due to the dead time factor at high count rates.



The Right Tube for Your Application Direct or Near Equivalent Matrix					
Canberra Tube	Military Spec	LND	TGM	Centronic	
2000 Series Pancake	2000	8767	7311	N1002	
	2001			N1002-1	
	2006		73118	N1006	
	2011		7231	N1004	ZP1450
2100 Series MICA End Window	2100			N202	
	2106	7616 Equiv.			
	2111				ZP1400
	2112		712	N205	ZP1401
	2121		7224	N206	ZP1410
	2123			N204	
	P2123			N204/MHV	
	2126	5979 Equiv.	722	N201	
	2131		723	N210	
	P2131		7232	N210/BNC	
2200 Series Thin Wall Beta	2200		719	N107	
	2202		721	N106	
	2206		720	N114	
	2211		725	N112	
	2216			N119	
	2300		72610		
2300 Series Thick Wall Gamma	2305			N305	ZP1200
	2306			N320	
	2311			N309	
	2314				
	2316		743	N310	
	2350		7802/78017		
2400 Series Miniature	2406		716	N115-1	ZP1300
	2411		714	N116-1	ZP1310
	2416		713	N117-1	ZP1320
	2420	Equivalent to Eurisys Mesures Model 4G60M			
	2422	Equivalent to Eurisys Mesures Model 3G10			
	2423	Equivalent to Eurisys Mesures Model 4G15			



Geiger Mueller Tubes

Features

Product Reliability

The Canberra Geiger Mueller tube has been carefully researched and developed to provide a rugged, reliable, long-lasting means of monitoring nuclear radiation levels. These detectors offer guaranteed advantages, including manufacturing consistency, product reliability and competitive pricing. Many of our tube types, including those approved for the military Quality Product List (QPL), are manufactured and tested to withstand rigorous shock and vibration per military standards. All Canberra GM tubes comply with our stringent quality assurance policies, which meet or exceed MIL-STD-9858A.

Our Warranty

All Canberra Geiger Mueller tubes are guaranteed against defects in materials or workmanship for 1 year following shipment.

Description

Guaranteed Analysis

As an end user of Geiger Mueller tubes for over 40 years, we have successfully bridged the gap between technical conception, detector design and field application to achieve the quality performance you demand.

Consider the Source

More than four decades of nuclear instrumentation design enables us to incorporate quality and reliability into an outstanding line of Geiger Mueller tubes, including 2000 Series pancake detectors. We offer extensive experience as both a manufacturer and end user of all types of radiation detectors. Over the years, our detectors have met and exceeded customer needs in laboratory, military and harsh industrial environments.

Our Geiger Mueller tubes are the obvious choice for the discerning user. These tubes are built to exhibit superior performance, reliability and long-term stability. Our extensive product line provides direct (or near equivalents) for industry-standard tubes, including all versions of pancake detectors and frisker probes.

Manufacturing Excellence

Canberra's manufacturing operation has refined the development and production of GM tubes. We utilize state-of-the-art instrumentation and the finest equipment to monitor and control all manufacturing processes. Our painstaking attention to every detail ensures contamination-free assemblies. We use only the highest quality materials to fabricate critical detector components. Our adherence to stringent design parameters and quality assurance ensures performance that meets or exceeds exacting commercial and military standards.

Canberra's growing detector division can offer substantial volume cost reductions for large orders.



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For other international representative offices visit our Web Site: <http://www.canberra.com> or contact the Canberra U.S.A. office.

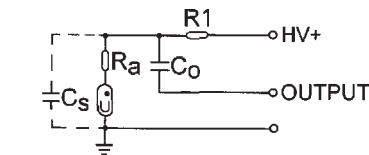
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Geiger Mueller Tubes

Derivation of tube parameters

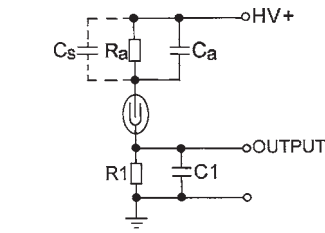
Test Circuits

By adding C_a in Figure 2, the effect of variations in tube capacity and circuit wiring due to working tolerances is minimized. However, C_a can be removed in many cases to reduce losses due to dead time at higher counting rates.



C_s = Stray capacitance typically < 1 pF.
C₀ = High voltage blocking capacitor.

Figure 1 - Anode Output

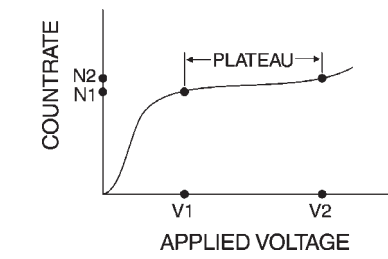


$$(C_s + C_a) R_a = C_1 \times R_1$$

Figure 2 - Cathode Output

Plateau Calculations

Plateau slope calculations for Canberra data sheets are based upon the I.E.C. recommended formula, as prescribed in the ISO-affiliated publication #151-25 part 25, "Methods of measurement of Geiger Mueller counter tubes".



$$\frac{N_2 - N_1}{1/2(N_1 + N_2)} \times \frac{100}{V_1 - V_2} = \% \text{ per volt}$$

Data Charts – Tube Performance Characteristics

Alpha Particle Detection

The table below shows the initial alpha energy required to penetrate a given mica window thickness as well as the approximate a particle range in air at 1 atm. This assumes a negligible air gap between the source and the window.

MICA Window	α Energy	α Range in Air
1.0 mg/cm ²	1.9 MeV	10 mm
2.0 mg/cm ²	2.6 MeV	15 mm
3.0 mg/cm ²	3.6 MeV	22 mm
4.0 mg/cm ²	4.5 MeV	29 mm

Beta Particle Detection

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

