

ELECTRONIC TUBE REFERENCE

18526

Specialized - Radiation Counter electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

GEIGERMULLERCOUNTER

Halogen-quenched end-window Geiger-Müller counter for alpha, beta, and gamma radiation. Its windowed construction permits detection of penetrating and less-penetrating radiation while permanent gas quenching supports stable counting operation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	— / —	PARALLEL HEATER	— / —
HEATING	Indirect; cold cathode	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 GeigerMullerCounter
No fixed ratings recorded.
Gas-filled radiation-counter section; counter-specific electrical characteristics are retained in TUBE_SECTION_PARAMETER.

18526 — Halogen-Quenched Radiation Counter Tube

The **18526** is a halogen-quenched radiation counter tube designed with an end window for the detection of alpha, beta, and gamma radiation. It features a gas filling of neon and argon combined with a halogen quenching agent. The tube is constructed with a thin mica end window and a robust chromium-iron cathode, making it suitable for sensitive radiation measurement applications.

Construction and Physical Dimensions

The 18526 is built with specific materials and dimensions optimized for radiation detection:

- **Mica Window:** The tube features an end window made of mica with an effective diameter of **27.8 mm** and an effective area of **6.1 cm²**. The window thickness is extremely thin, ranging from **1.5 to 2 mg/cm²**, allowing alpha and low-energy beta particles to penetrate into the active volume.
- **Cathode:** The cathode is constructed from an alloy of **28% chromium and 72% iron**. It has a wall thickness of **1.3 mm**, an inside diameter of **27.8 mm**, and an effective length of **37 mm**.
- **Gas Filling:** The active volume is filled with a mixture of **Neon (Ne)** and **Argon (Ar)**, along with a **halogen quenching agent** to terminate the ionization discharges.
- **Physical Dimensions:**
 - Body diameter: **29.9 to 30.9 mm**
 - Window flange diameter: **33 to 34 mm**
 - Body length: **38 mm**
 - Total length (excluding pins): **41 to 45 mm**

Electrical Characteristics and Operating Parameters

At an ambient temperature of 25 °C, the typical operating parameters of the 18526 are characterized by a wide plateau and low background count rate:

- **Interelectrode Capacitance:** The tube has a capacitance of **3.5 pF**.
- **Starting Voltage (V_{ign}):** The maximum starting voltage is **375 V**.
- **Operating Voltage (V_b):** The operating voltage can be set arbitrarily within the plateau range.
- **Plateau Range (V_{pl}):** The plateau extends from **450 V to 750 V**.
- **Plateau Slope (S_{pl}):** The maximum slope of the plateau is **0.02 %/V**, ensuring stable counting performance despite minor fluctuations in the high-voltage supply.
- **Background (N_0):** When shielded with **5 cm of lead (Pb)** and **3 mm of aluminum (Al)**, the maximum background count rate is **20 counts per minute**.
- **Dead Time (τ):** The maximum dead time is **200 μ s** at an operating voltage (V_b) of **600 V**.

Absolute Maximum Ratings

To prevent damage and ensure reliable operation, the 18526 must be operated within the following absolute limits:

- **Maximum Anode Voltage (V_a):** **750 V**
- **Minimum Anode Resistor (R):** **2 M Ω**
- **Ambient Temperature Range (t_{amb}):** **-50 °C to +75 °C**

Circuit Design and Mounting Recommendations

For optimal performance, the physical installation and electrical circuit of the 18526 must minimize stray capacitance and leakage currents:

- **Mounting:** The connection between the anode and the anode series resistor must be kept as short as possible. Additionally, the capacitance between the anode and earth must be minimized to prevent

pulse distortion and prolonged dead times.

- **Recommended Circuit:** The anode should be connected to the high-voltage supply ($+V_b$) through a series anode resistor (R) of **10 M Ω** . The signal output is ideally taken from a **1/10 R tap** (a voltage divider tap at one-tenth of the series resistance).
- **Maintenance:** The tube must be kept dry and clean during storage and operation to prevent external leakage currents, which could degrade the signal-to-noise ratio or cause spurious counts.

Environmental and Operating Curves

The performance of the 18526 varies systematically with temperature and operating voltage:

- **Starting Voltage vs. Temperature:** The starting voltage (V_{ign}) is highly stable, remaining around **340 V to 350 V** across a wide temperature range from **-40 °C to +80 °C**. However, at temperatures below **-40 °C**, the starting voltage drops sharply, reaching approximately **290 V at -60 °C**.
- **Plateau Curve:** The characteristic curve of counts per second versus operating voltage (V_b) exhibits a flat, stable plateau region extending from approximately **450 V to 750 V**.
- **Dead Time vs. Voltage:** The dead time (τ) is voltage-dependent. It peaks at approximately **200 μ s** near the beginning of the plateau at **450 V**, and then decreases steadily as the voltage increases, falling to approximately **130 μ s at 800 V**.

Technical Summary

The **18526** is a halogen-quenched Geiger-Müller radiation counter tube featuring a **27.8 mm mica end window** (thickness **1.5 to 2 mg/cm²**) and a **chromium-iron cathode**. It is designed for detecting alpha, beta, and gamma radiation. Operating with a **10 M Ω anode resistor**, it features a wide plateau from **450 V to 750 V** with a maximum slope of **0.02 %/V** and a maximum starting voltage of **375 V**. The tube exhibits a maximum dead time of **200 μ s at 600 V** and a low background count rate of **20 counts/min** under shielding. It is rated for operation between **-50 °C and +75 °C**, requiring clean, dry conditions and minimal anode-to-earth capacitance for optimal pulse resolution.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1999 Philips 0-D

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1999 PHILIPS 0-D

Section 1 · GeigerMullerCounter

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Filling	Neon, argon and halogen quenching agent	—
Mica window effective diameter	27.8 mm	—
Mica window area	6.1 cm ²	—
Mica window thickness	1.5-2 mg/cm ²	—
Cathode wall thickness	1.3 mm	—
Cathode effective length	37 mm	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Interelectrode capacitance	3.5 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode resistor	10 Mohm	—
Operating voltage minimum	450 V	—
Operating voltage maximum	750 V	—
Absolute maximum anode voltage	750 V	—
Minimum anode resistance	2 Mohm	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Starting voltage maximum	375 V	—
Plateau slope maximum	0.02 %/V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Shielded background maximum	20 counts/min	5cmPb;3mmAl
Dead time maximum	200 usec	Vp=600V

TUBE TINKER

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