



ELECTRONIC TUBE REFERENCE

18519

Specialized - Radiation Counter electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

GEIGERMULLERCOUNTER

High-current halogen-quenched Geiger-Müller monitoring counter for gamma and hard X-radiation. Its construction is intended for radiation-monitoring service where comparatively intense penetrating radiation must be counted reliably.

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.

18519 — Halogen-Quenched Radiation Counter Tube

A high-current, halogen-quenched Geiger-Müller radiation detection tube designed for monitoring and measuring gamma and hard X-radiation.

Overview

The **18519** is a high-current, halogen-quenched radiation monitoring, detection, and counter tube. It is engineered specifically for the detection and measurement of gamma and hard X-radiation. The tube utilizes a gas mixture of neon and argon, combined with a halogen quenching agent, to facilitate stable

and repeatable pulse counting. Housed in a compact glass envelope with flying lead connections, the 18519 is designed for integration into portable or fixed radiation monitoring equipment.

Mechanical and Construction Details

The 18519 features a robust construction optimized for radiation detection. The envelope is made of glass, housing a cathode fabricated from an alloy of 20% chromium and 80% iron. The combined wall thickness of the chrome iron and glass cathode structure is 400 mg/cm².

The physical dimensions of the tube are highly compact:

- **Maximum body length:** 80 mm
- **Maximum diameter:** 10 mm
- **Weight:** 5 g

The internal cathode has an inside diameter of 6 mm and an effective length of 40 mm. Electrical connections are made via flexible flying leads, each measuring 95 mm in length. To ensure correct polarity during installation, the leads are color-coded:

- **Red lead:** Anode (a)
- **Black lead:** Cathode (k)

Electrical and Operating Characteristics

At an ambient temperature of 20 °C, the 18519 exhibits highly defined electrical parameters. The interelectrode capacitance of the tube is 2.2 pF.

The tube operates within the Geiger-Müller region, characterized by the following parameters:

- **Starting Voltage (V_{ign}):** Minimum 350 V, maximum 370 V.
- **Minimum Operating Voltage (V_b):** 450 V.
- **Plateau Length:** 225 V.
- **Plateau Slope:** Typically 0.07%/V, with a maximum limit of 0.15%/V.
- **Dead Time:** 35 µs when operating at a supply voltage (V_b) of 500 V.
- **Background Count Rate:** 1.5 counts/min when shielded with 2 inches of lead (Pb) and 1/4 inch of aluminum (Al).
- **Expected Operating Life:** Minimum of 1500 hours when operated at a current (I) of 50 µA.

Environmental Limits

The tube is rated for operation across a wide temperature range, with absolute limits for ambient temperature (t_{amb}) specified from a minimum of -40 °C to a maximum of +75 °C.

Circuit Configuration and Operation

In a typical application circuit, the 18519 is configured with the cathode grounded. The anode is connected to the positive high-voltage supply (+V_b) through an anode resistance (R_a) consisting of two

series-connected 2.7 M Ω resistors (providing a total series resistance of 5.4 M Ω).

The signal output is taken directly from the junction node between these two series resistors. This configuration helps isolate the output signal from the high-voltage supply rail while maintaining the necessary quenching resistance in series with the anode.

Plateau Characteristics

The relationship between the count rate (counts per second) and the operating voltage (V_b) shows a highly stable and flat plateau region. This plateau extends from approximately 450 V to 675 V, where the count rate remains steady at around 150 counts/sec. Beyond 675 V, as the voltage approaches 900 V, the tube enters a region of continuous discharge, causing the count rate to rise sharply. For reliable radiation measurement, the operating voltage should be selected within the stable plateau region.

Technical Summary

The **18519** is a specialized glass-envelope, halogen-quenched radiation counter tube designed for detecting gamma and hard X-radiation. Featuring a chromium-iron cathode, neon-argon gas filling, and flexible flying leads, it combines a compact physical form factor with stable electrical characteristics. With a plateau length of 225 V, a typical plateau slope of 0.07%/V, and a dead time of 35 μ s at 500 V, the 18519 provides reliable performance for radiation monitoring applications over an ambient temperature range of -40 °C to +75 °C.

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	—
Cathode inside diameter	6 mm	—
Cathode effective length	40 mm	—

CAPACITANCE

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Interelectrode capacitance	2.2 pF	—

CHARACTERISTICS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Starting voltage minimum	350 V	—
Starting voltage maximum	370 V	—
Plateau length	225 V	—
Plateau slope typical	0.07 %/V	—
Plateau slope maximum	0.15 %/V	—
Dead time	35 usec	V _p =500V
Expected life minimum	1500 h	MeanCurrent=50uA

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Operating voltage minimum	450 V	—

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes,
and their source documents.

