

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

1B68

1 SECTION

CONSTRUCTION

Specialized - Radiation Counter electronic tube

GEIGERMULLERCOUNTER

Self-quenching Geiger-Müller counter for beta and gamma radiation detection and measurement. Its gas-filled pulse-counting operation suits general radiation survey, monitoring, and laboratory instruments.

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

SECTION0	GeigerMullerCounter
No fixed ratings recorded.	

1B68 — Self-Quenched Beta and Gamma Counter Tube

The **1B68** (also designated as the **1B68/VG-13**) is a self-quenched Geiger-Mueller counter tube designed for the detection of beta and gamma radiation. Registered under RMA release number 705 on October 28, 1948, the device was manufactured by The Victoreen Instrument Company of Cleveland, Ohio. It is engineered to provide highly efficient radiation detection within a robust, specialized physical envelope.

Mechanical Construction and Physical Dimensions

The 1B68 features a cylindrical construction optimized for radiation sensitivity and physical integration into detection equipment. The tube is terminated with flexible wire leads rather than a standard pin base, facilitating direct soldering or custom mounting configurations.

The physical dimensions and construction details of the tube include:

- **Overall Length:** 8-1/8 inches maximum
- **Diameter:** 25/32 inches maximum
- **Lead Length:** 3-1/2 inches for both the anode and cathode terminals
- **Anode Length:** 2-5/8 inches
- **Sensitive/Active Length:** 3 inches minimum
- **Wall Thickness:** 30 mg/cm²

The thin wall thickness of 30 mg/cm² is critical to its function, allowing beta particles to penetrate the active volume of the tube while maintaining structural integrity.

Electrical and Detection Characteristics

The 1B68 operates in the Geiger-Mueller region, utilizing a self-quenching gas mixture to terminate the ionization discharge after each detection event. The electrical and performance parameters under standard operating conditions are specified as follows:

Parameter	Specification
Nominal Operating Voltage	900 VDC
Maximum Geiger Threshold Voltage	850 VDC
Minimum Plateau Length	200 V
Maximum Relative Plateau Slope	3.0% per 100 V
Nominal Background Count Rate	35 counts/min (at operating voltage)
Nominal Recovery Time	100 μs
Beta Detection Efficiency	99.8%
Static Electrode Capacitance	2.2 μμF

The low static electrode capacitance of 2.2 μμF helps minimize the pulse rise time and overall charge per pulse. The nominal recovery time of 100 μs defines the resolving time limitations of the tube during high-count-rate applications. The plateau characteristics ensure stable operation, with a slope of no more than 3.0% per 100 V over a minimum range of 200 V above the threshold.

Environmental Ratings

The 1B68 is rated for operation across a defined thermal range. The maximum ratings specify that the ambient temperature must be maintained within the following limits:

- **Minimum Ambient Temperature:** 0 °C
- **Maximum Ambient Temperature:** 100 °C

Operating the tube outside of this 0 to 100 °C range may affect the quenching gas characteristics, plateau stability, or overall detection reliability.

Technical Summary

The **1B68** is a specialized, self-quenched counter tube designed by The Victoreen Instrument Company for beta and gamma radiation detection. Characterized by its nominal 900 VDC operating voltage, high beta efficiency of 99.8%, and a low background count rate of 35 counts per minute, the tube provides reliable performance in radiation measurement applications. Its physical design features a 30 mg/cm² wall, a minimum 3-inch active length, and 3-1/2 inch wire leads for anode and cathode connections, making it a distinct and highly optimized component of mid-twentieth-century radiation detection technology.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Victoreen

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

1950 VICTOREEN

Section 0 · GeigerMullerCounter

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
GeigerThresholdVoltage	850 V	Max
Operating Voltage	900 V	Nominal

CHARACTERISTIC

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
PlateauLength	200 V	Minimum
RelativePlateauSlope	3 %/100V	Maximum
Background	105 counts/min	Max

CAPACITANCE

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
ElectrodeCapacitance	2.2 pF	—

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