



ELECTRONIC TUBE REFERENCE

1B75

Specialized - Radiation Counter electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

GEIGERMULLERCOUNTER

Gas-filled Geiger-Müller radiation counter for pulse-counting detection. Available source material confirms the radiation-counter function while providing insufficient evidence for a narrower alpha, beta, gamma, or X-ray specialization.

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

SECTION 1 GeigerMullerCounter

No fixed ratings recorded.

Counter-tube source does not publish ordinary active-electrode promoted fields; counter performance is retained in parameters.

1B75 — Beta Counter Tube

A gas-filled radiation detector designed for the measurement and detection of beta radiation, featuring a stainless steel cathode and a thin mica window.

Overview

The **1B75** is a specialized beta counter tube designed for detecting and measuring beta radiation. Sponsored by the Amperex Electronic Corporation, the device was registered under RMA Release No. 657 on April 30, 1948, with subsequent updates in Release No. 657A on May 27, 1949. Unlike typical thermionic vacuum tubes, the 1B75 is a gas-filled radiation detector utilizing an argon gas filling

combined with a quenching admixture. It features a stainless steel cathode and a thin mica window optimized for the transmission of low-energy beta particles.

Construction and Physical Dimensions

The physical design of the 1B75 is engineered to facilitate the entry of beta radiation into its active volume while maintaining structural integrity. The tube features a stainless steel cathode with an outer diameter of 1.187 inches (with a tolerance of ± 0.010 inches), a wall thickness of 3/32 inches, and a length of 1 1/2 inches.

To allow beta particles to enter the active region, the tube is constructed with a very thin mica window. This window has a thickness of 0.0005 inches, which corresponds to an areal density of 3.5 mg/cm² or a physical thickness of 12.70 microns. The effective diameter of this window is 1 3/32 inches, and it is protected by a window guard with a maximum diameter of 1 11/32 inches. This thin window configuration enables the tube to pass all beta radiation with energies exceeding 43 KEV when the radiation source is positioned in close proximity to the window.

The overall length of the 1B75 is approximately 3 5/8 inches. The anode terminal has a diameter of 0.056 inches (with a tolerance of ± 0.007 inches). The terminal capacity of the device is rated at 1.0 mmf.

Operating Characteristics and Environmental Ratings

The 1B75 operates as a Geiger-Müller style counter tube with a recommended operating potential of 1200 V D.C. It exhibits a wide voltage plateau and stable counting characteristics across its operating range.

Plateau and Counting Performance

The tube's plateau length is in excess of 300 V. The slope of this plateau varies depending on the registration standard:

- **As Registered (1948):** The slope is specified between 2% and 5% per 100 V.
- **As Proposed (1949):** The maximum slope is specified as 10% per 100 V.

The tube has a dead time of 200 microseconds, which limits the maximum resolvable count rate before coincidence losses become significant. Under unshielded conditions, the background count rate is approximately 50 counts per minute. Due to its gas-discharge mechanism and quenching agent, the life expectancy of the 1B75 is unlimited by use, meaning it does not suffer from the typical filament or cathode depletion seen in thermionic tubes.

Environmental and Temperature Ratings

The permissible operating temperature range for the 1B75 also differs between the initial registration and the subsequent 1949 proposal:

- **As Registered (1948):** -70°C to +100°C
- **As Proposed (1949):** -55°C to +75°C

These temperature limits define the environmental boundaries within which the gas mixture and quenching agent remain stable and effective for radiation detection.

Technical Summary

The **1B75** is a gas-filled beta counter tube featuring an argon and quenching gas mixture, a stainless steel cathode, and a 0.0005-inch mica window. Operating at a nominal 1200 V D.C., it provides a plateau exceeding 300 V with a dead time of 200 microseconds and an unshielded background of 50 counts per minute. Its physical construction is optimized for detecting beta radiation above 43 KEV, offering an exceptionally long operational life that is virtually unlimited by use.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1953 Amperex

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

1953 AMPEREX

Section 1 · GeigerMullerCounter

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Operating voltage	1200 V	—
Plateau minimum	300 V	—
Dead time approximate	200 us	—