

ELECTRONIC TUBE REFERENCE

120NB

Specialized - Radiation Counter electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

GEIGERMULLERCOUNTER

Based self-quenching Geiger-Müller counter intended for beta-radiation detection, combining a thin mica entrance window with gas-filled pulse-counting operation for laboratory radiation measurements.

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.	
Permanent-sensitivity gas-filled radiation counter tube for Beta detection.	

120NB Radiation Counter Tube

The **120NB** is a permanent-sensitivity radiation counter tube designed specifically for beta radiation detection. It features a robust mechanical design with a stainless steel cathode, a thin mica window for particle penetration, and a neon-based gas filling with a quenching admixture. The tube is engineered for stable operation over a wide temperature range and offers an unlimited life expectancy.

Physical Construction and Dimensions

The 120NB is constructed with a stainless steel cathode and a specialized mica window to facilitate the entry of beta particles. The physical dimensions and structural parameters of the tube are precisely defined:

- **Cathode Material:** Stainless steel
- **Effective Cathode Dimensions:** 2-11/16 inches long with a 2-inch outer diameter (O.D.) and a wall thickness of 5/64 inches.
- **Mica Window Thickness:** 0.0008 inches, which corresponds to an areal density of 5.6 mg/cm² or a physical thickness of 20.32 microns.
- **Effective Window Diameter:** 1-29/32 inches.
- **Base Type:** 4-pin base.
- **Maximum Overall Dimensions:** 2-5/16 inches in diameter by 5-3/4 inches in length.

The use of a stainless steel cathode ensures structural integrity and chemical compatibility with the internal gas chemistry, while the thin mica window is optimized to minimize attenuation of incoming beta radiation.

Electrical and Operating Characteristics

The 120NB operates as a Geiger-Müller style counter tube utilizing a neon gas filling combined with a quenching admixture to terminate the discharge cycle. Its electrical performance is characterized by the following parameters:

- **Operating Voltage:** 700 V D.C.
- **Plateau Length:** In excess of 200 volts.
- **Plateau Slope:** 5% to 10% per 100 volts.
- **Dead Time:** Approximately 300 microseconds.
- **Maximum Background Count:** 100 counts per minute when shielded by a 2-inch lead enclosure.

The plateau characteristics ensure that small fluctuations in the high-voltage power supply do not significantly affect the counting rate. The dead time of 300 microseconds defines the resolving time of the detector, which is critical for calculating coincidence losses at high count rates.

Environmental and Life Ratings

The 120NB is designed to operate reliably under demanding environmental conditions. It features an unlimited life expectancy, meaning its sensitivity and electrical characteristics do not degrade as a consequence of use. The operating temperature limits are specified as:

- **Minimum Operating Temperature:** -55°C
- **Maximum Operating Temperature:** +75°C

Technical Summary

The 120NB is a highly specialized beta radiation counter tube featuring a 4-pin base, a large-diameter stainless steel cathode, and a thin 20.32-micron mica window. Operating at a nominal 700 V D.C., it provides a stable plateau exceeding 200 volts and a controlled dead time of approximately 300 microseconds.

Parameter	Specification
Primary Application	Beta detection
Gas Filling	Neon + quenching admixture
Cathode Material	Stainless steel
Cathode Dimensions	2-11/16" length x 2" O.D. x 5/64" wall
Mica Window Thickness	0.0008 in. (5.6 mg/cm ² / 20.32 μm)
Effective Window Diameter	1-29/32"
Operating Voltage	700 V D.C.
Plateau Range	> 200 V
Plateau Slope	5% to 10% per 100 V
Dead Time (Approx.)	300 μs
Max Background (2" Lead Shield)	100 cpm
Operating Temperature Range	-55°C to +75°C
Life Expectancy	Unlimited by use
Max Overall Dimensions	2-5/16" diameter x 5-3/4" length
Base	4-Pin

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1958 Amperex Industrial

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

1958 AMPEREX INDUSTRIAL

Section 1 · GeigerMullerCounter

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Filling	Neon + quenching admixture	—
Operating voltage	700 V	DC
Window thickness	0.0008 in	MicaWindow
Window areal density	5.6 mg/cm ²	MicaWindow
Effective mica-window diameter	1-29/32 in	—
Cathode dimensions	2-11/16 long x 2 OD x 5/64 wall	—
Maximum overall tube dimensions	2-5/16 x 5-3/4; 4-pin base	—
Radiation application	Beta	—
Operating temperature range minimum	-55 degC	—
Operating temperature range maximum	75 degC	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plateau length	in excess of 200 V	—
Plateau slope	5% to 10% per 100 V	—
Dead time	300 us	Approximate
Maximum shielded background	100 counts/min	Shielded by 2 inches of lead

TUBE TINKER

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

