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# MULTIPLIER PHOTOTUBE

9-STAGE TYPE HAVING S-19 RESPONSE

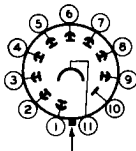
For detection and measurement of ultraviolet radiation

## DATA

### General:

Spectral Response . . . . .	S-19
Wavelength of Maximum Response . . . . .	3300 ± 500 angstroms
Cathode:	
Minimum projected length <sup>•</sup> . . . . .	0.94"
Minimum projected width <sup>•</sup> . . . . .	0.31"
Direct Interelectrode Capacitances (Approx.):	
Anode to dynode No.9 . . . . .	4.4 μμf
Anode to all other electrodes. . . . .	6 μμf
Maximum Overall Length . . . . .	5.69"
Maximum Seated Length. . . . .	5.12"
Length from Base Seat to Center of	
Useful Cathode Area. . . . .	3.94" ± 0.09"
Maximum Diameter . . . . .	1.31"
Weight (Approx.) . . . . .	1.8 oz
Operating Position . . . . .	Any
Bulb . . . . .	Fused-Silica Section with Graded Seal
Socket . . . . .	Amphenol Part No.78RS-11T, or equivalent
Base . . . . .	Small-Shell Submagnal 11-Pin (JETEC No.B11-88), Non-hygroscopic
Basing Designation for BOTTOM VIEW . . . . .	.11K

- Pin 1 - Dynode No.1
- Pin 2 - Dynode No.2
- Pin 3 - Dynode No.3
- Pin 4 - Dynode No.4
- Pin 5 - Dynode No.5
- Pin 6 - Dynode No.6



- Pin 7 - Dynode No.7
- Pin 8 - Dynode No.8
- Pin 9 - Dynode No.9
- Pin 10 - Anode
- Pin 11 - Photo-cathode

### Maximum Ratings, Absolute Values:

SUPPLY VOLTAGE BETWEEN ANODE AND CATHODE (DC or Peak AC). . . . .	1250 max. volts
SUPPLY VOLTAGE BETWEEN ANODE AND DYNODE No.9 (DC or Peak AC). . . . .	250 max. volts
AVERAGE ANODE CURRENT* . . . . .	0.5 max. ma
AMBIENT-TEMPERATURE RANGE. . . . .	-80 to +75 °C

<sup>•</sup>,\*: See next page.



7200

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## Characteristics:

Under conditions with dc supply voltage (E) across a voltage divider providing 1/10 of E between cathode and dynode No.1; 1/10 of E for each succeeding dynode stage; and 1/10 of E between dynode No.9 and anode

With E = 1000 volts dc (except as noted)

	Min.	Median	Max.	
Sensitivity:				
Radiant, at				
3300 angstroms. .	-	65000	-	$\mu\text{a}/\mu\text{W}$
Cathode radiant, at				
3300 angstroms. .	-	0.065	-	$\mu\text{a}/\mu\text{W}$
Luminous:*				
At 0 cps. . . . .	15	40	300	amp/lumen
Cathode luminous. †	20	40	-	$\mu\text{a}/\text{lumen}$
Current Amplification	-	1000000	-	
Equivalent Anode-Dark-Current Input <sup>▲</sup> □ . .	-	$2 \times 10^{-10}$	$2 \times 10^{-9}$	lumen
Equivalent Noise				
Input:				
Luminous*—				
At +25° C . . . . .	-	$7.5 \times 10^{-13}$	-	lumen
At -78° C . . . . .	-	$4 \times 10^{-14}$	-	lumen
Ultraviolet†—				
At +25° C . . . . .	-	$6.6 \times 10^{-16}$	-	watt
At -78° C . . . . .	-	$4 \times 10^{-17}$	-	watt

● On plane perpendicular to the indicated direction of incident light.

\* Averaged over any interval of 30 seconds maximum.

# For conditions where the light source is a tungsten-filament lamp operated at a color temperature of 2870° K. A light input of 10 microlumens is used. The load resistor has a value of 0.01 megohm.

‡ For conditions the same as shown under (#) except that the value of light flux is 0.01 lumen and 100 volts are applied between cathode and all other electrodes connected together as anode.

▲ Supply voltage (E) adjusted to give a luminous sensitivity of 20 amperes per lumen. Dark current caused by thermionic emission and ion feedback may be reduced by the use of a refrigerant.

□ For maximum signal-to-noise ratio, operation with a supply voltage (E) below 1000 volts is recommended.

\* Under the following conditions: Supply voltage (E) is 1000 volts, external shield operated at -1000 volts with respect to anode, 25° C tube temperature, ac-amplifier bandwidth of 1 cycle per second, tungsten light source at color temperature of 2870° K interrupted at a low audio frequency to produce incident radiation pulses alternating between zero and the value stated. The "on" period of the pulse is equal to the "off" period. The output current is measured through a filter which passes only the fundamental frequency of the pulses.

† Determined under the same conditions as shown under (\*) except that use is made of monochromatic source having radiation of 2537 angstroms.



7200

7200

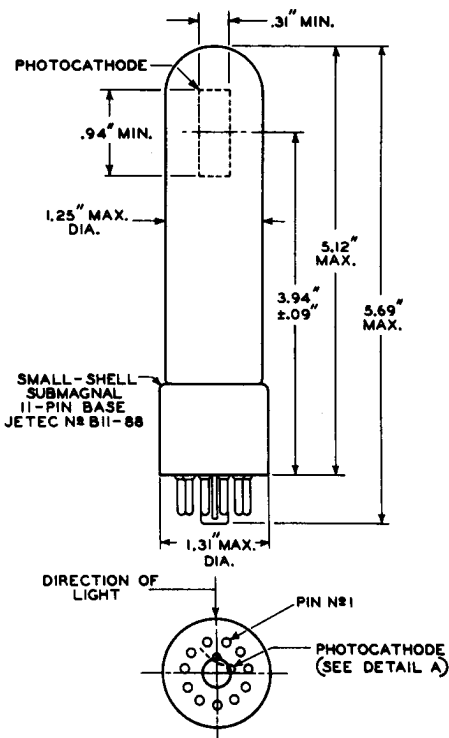
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## OPERATING CONSIDERATIONS

The use of an *average anode current* well below the maximum rated value of 0.5 milliampere is recommended when stability of operation is important.

*Electrostatic and/or magnetic shielding* of the 7200 may be necessary.

**SPECTRAL-SENSITIVITY CHARACTERISTIC**  
of Phototube having S-19 Response  
is shown at the front of this Section



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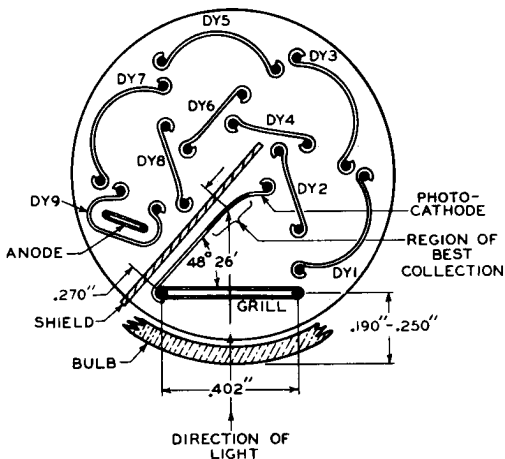
7200



7200

## MULTIPLIER PHOTOTUBE

DETAIL A



92CS-8674R1

**NOTE 1:** CENTER LINE OF BULB WILL NOT DEVIATE MORE THAN  $2^{\circ}$  IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT CENTER OF BOTTOM OF BASE.

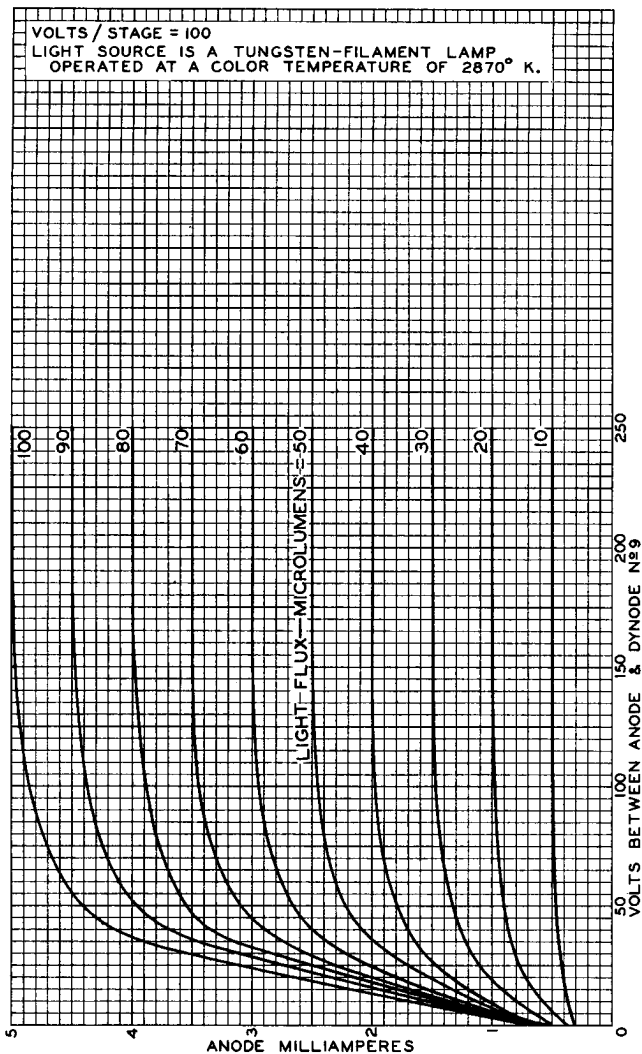
**NOTE 2:** THE MAXIMUM ANGULAR VARIATION BETWEEN THE PLANE THROUGH PINS I AND II AND THE PLANE OF THE GRILL WILL NOT EXCEED  $6^{\circ}$ .



7200

7200

### AVERAGE ANODE CHARACTERISTICS



ELECTRON TUBE DIVISION

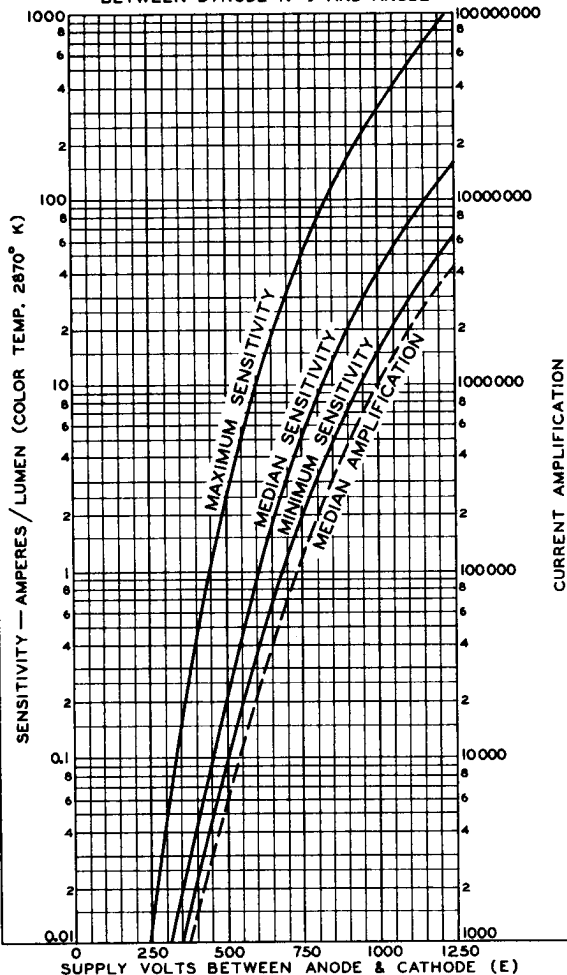
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9577



## CHARACTERISTICS

SUPPLY VOLTAGE (E) ACROSS VOLTAGE DIVIDER PROVIDING  $\frac{1}{10}$  OF E BETWEEN CATHODE AND DYNODE N<sup>o</sup> 1;  $\frac{1}{10}$  OF E FOR EACH SUCCEEDING DYNODE STAGE; AND  $\frac{1}{10}$  OF E BETWEEN DYNODE N<sup>o</sup> 9 AND ANODE

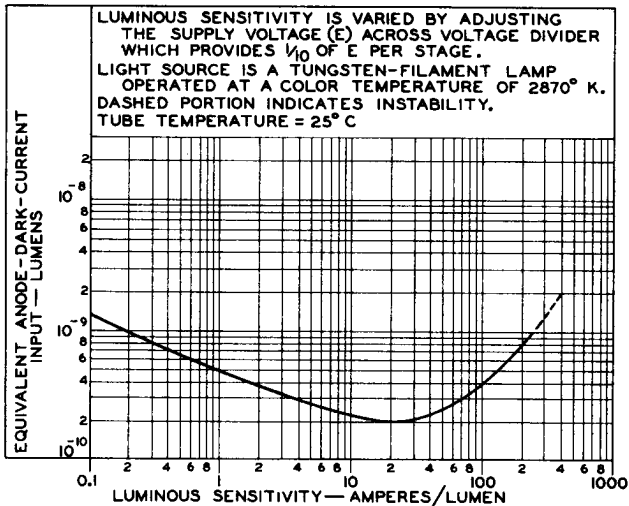




7200

7200

### TYPICAL ANODE-DARK-CURRENT CHARACTERISTIC



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