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MULTIPLIER PHOTOTUBE

10-STAGE, HEAD-ON, FLAT-FACEPLATE TYPE WITH
1.68"-DIAMETER, CURVED, CIRCULAR, SEMITRANS-
PARENT PHOTOCATHODE AND S-20 RESPONSE

DATA**General:**

Spectral Response.	S-20
Wavelength of Maximum Response	4200 $\pm$ 500 angstroms
Cathode, Semitransparent:	
Shape.	Curved Circular
Window:	
Area	2.2 sq. in.
Minimum diameter	1.68 in.
Index of refraction.	1.51
Direct Interelectrode Capacitances (Approx.):	
Anode to dynode No.10.	2.4 $\mu\mu\text{f}$
Anode to all other electrodes.	5.5 $\mu\mu\text{f}$
Dynode No.10 to all other electrodes	6.5 $\mu\mu\text{f}$
Maximum Overall Length	6.78"
Seated Length.	5.84" $\pm$ 0.19"
Maximum Diameter	2.38"
Operating Position	Any
Weight (Approx.)	6 oz
Bulb	T16
Base	Medium-Shell Diheptal 14-Pin (JEDEC Group 5, No.B14-38), Non-hygroscopic
Basing Designation for BOTTOM VIEW	14AM

- 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 - Dynode No.10
Pin 11 - Anode



DIRECTION OF LIGHT:
INTO END OF BULB

- Pin 12 - Internal
Connection—
Do Not Use
Pin 13 - Focusing
Electrode
Pin 14 - Photo-
cathode
Metal
Collar - No Connection
(If used,
connect only
to photo-
cathode)

Maximum Ratings, Absolute Values:

SUPPLY VOLTAGE BETWEEN ANODE AND CATHODE (DC)	2400 max.	volts
SUPPLY VOLTAGE BETWEEN DYNODE No.10 AND ANODE (DC)	500 max.	volts
SUPPLY VOLTAGE BETWEEN CONSECUTIVE DYNODES (DC)	600 max.	volts
DYNODE-No.1 SUPPLY VOLTAGE (DC).	500 max.	volts
FOCUSING-ELECTRODE SUPPLY VOLTAGE (DC)	500 max.	volts
AVERAGE ANODE CURRENT*	1 max.	ma
AMBIENT TEMPERATURE.	85 max.	$^{\circ}\text{C}$

*: See next page.



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Characteristics Range Values for Equipment Design:

Under conditions with dc supply voltage (E) across a voltage divider providing 1/6 of E between cathode and dynode No. 1; 1/8 of E between cathode and focusing electrode; 1/12 of E for each succeeding dynode stage; and 1/12 of E between dynode No. 10 and anode

With E = 1800 volts (Except as noted)

	Min.	Median	Max.	
Sensitivity:				
Radiant, at 4200 angstroms. . . .	-	9600	-	$\mu\text{a}/\mu\text{W}$
Cathode radiant, at 4200 angstroms. . . .	-	0.064	-	$\mu\text{a}/\mu\text{W}$
Luminous.	5	22.5	150	amp/lumen
Cathode luminous:				
With tungsten light source [▲]	120	150	-	$\mu\text{a}/\text{lumen}$
With blue light source ^{▲♦}	0.05	-	-	μa
With red light source ^{♦§}	0.3	-	-	μa
Current				
Amplification. . .	-	1.5×10^5	-	
Equivalent Anode-Dark-Current				
Input [■]	-	3×10^{-10}	1.4×10^{-9}	lumen
Equivalent Noise				
Input: [*]				
At +25° C.	-	1.9×10^{-12}	4.3×10^{-12}	lumen
At -80° C.	-	3×10^{-13}	6×10^{-13}	lumen
Anode-Pulse Rise				
Time [●]	-	2.5	-	milli μsec
Greatest Delay Between Anode Pulses:				
Due to position from which electrons are simultaneously released within a circle centered on tube face and having a diameter of—				
1.12".	-	1 [†]	-	milli μsec
1.56".	-	3 [†]	-	milli μsec

● Averaged over any interval of 30 seconds maximum.

▲, ▲, **, ♦, □, §, *, ■, ●, †: See next page.



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- Under the following conditions: The light source is a tungsten-filament lamp operated at a color temperature of 2870° K. A light input of 0.1 microlumen is used. The load resistor has a value of 0.01 megohm.
- Under the following conditions: The light source is a tungsten-filament lamp operated at a color temperature of 2870° K. The value of light flux is 0.01 lumen and 200 volts are applied between cathode and all other electrodes connected together as anode. The load resistor has a value of 0.01 megohm.
- ** Under the following conditions: Light incident on the cathode is transmitted through a blue filter (Corning, Glass Code No. 5113 polished to 1/2 stock thickness) from a tungsten-filament lamp operated at a color temperature of 2870° K. The value of light flux on the filter is 0.01 lumen. The load resistor has a value of 0.01 megohm and 200 volts are applied between cathode and all other electrodes connected together as anode.
- For spectral characteristic of this source, see sheet SPECTRAL CHARACTERISTIC OF 2870° K LIGHT SOURCE AND SPECTRAL CHARACTERISTIC OF LIGHT FROM 2870° K SOURCE AFTER PASSING THROUGH INDICATED BLUE FILTER at front of this section.
- Under the following conditions: Light incident on the cathode is transmitted through a red filter (Corning, Glass Code No. 2418, or equivalent) from a tungsten-filament lamp operated at a color temperature of 2870° K. The value of light flux on the filter is 0.01 lumen. The load resistor has a value of 0.01 megohm, and 200 volts are applied between cathode and all other electrodes connected together as anode.
- § For spectral characteristic of this source, see sheet SPECTRAL CHARACTERISTIC OF 2870° K LIGHT SOURCE AND SPECTRAL CHARACTERISTIC OF LIGHT FROM 2870° K SOURCE AFTER PASSING THROUGH INDICATED RED FILTER at front of this section.
- Measured at a tube temperature of 25° C and with the supply voltage (E) adjusted to give a luminous sensitivity of 20 amperes per lumen. Dark current caused by thermionic emission may be reduced by the use of a refrigerant.
- For maximum signal-to-noise ratio, operation with a supply voltage (E) below 1800 volts is recommended.
- * Under the following conditions: Supply voltage (E) is 1800 volts, external-shield potential of -1800 volts, ac-amplifier bandwidth of 1 cycle per second, tungsten light source 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.
- Measured between 10 per cent and 90 per cent of maximum anode-pulse height. This anode-pulse rise time is determined primarily by transit-time variations in the multiplier stages and with an incident-light spot approximately 1 millimeter in diameter centered on the photocathode.
- † These values also represent the difference in time of transit between the photocathode and dynode No. 1 for electrons simultaneously released from the center and from the periphery of the specified areas.

OPERATING CONSIDERATIONS

Operation at an average anode current well below the maximum rated value of 1 milliamperes is recommended when stability is important.

Electrostatic and/or magnetic shielding of the 7326 may be necessary.

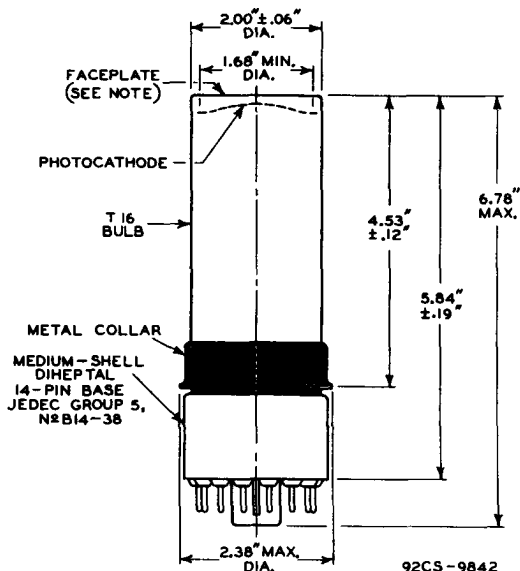
SPECTRAL-SENSITIVITY CHARACTERISTIC
of Phototube having S-20 Response
is shown at front of this Section

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CENTER LINE OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF BOTTOM OF THE BASE.

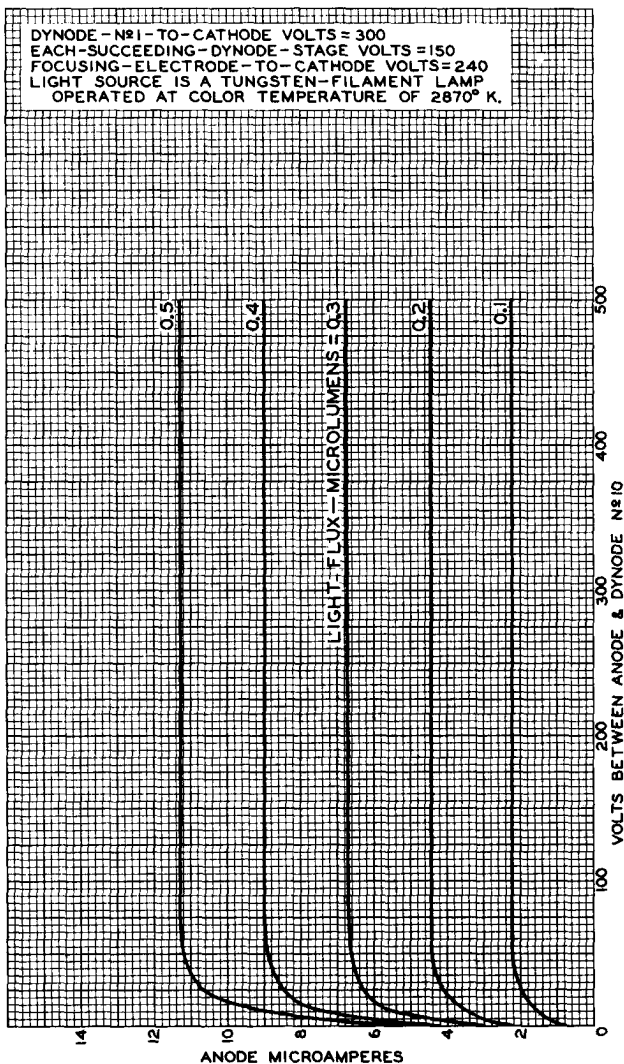
NOTE: WITHIN 1.68 " DIAMETER, DEVIATION FROM FLATNESS OF EXTERNAL SURFACE OF FACEPLATE WILL NOT EXCEED 0.005 " FROM PEAK TO VALLEY.



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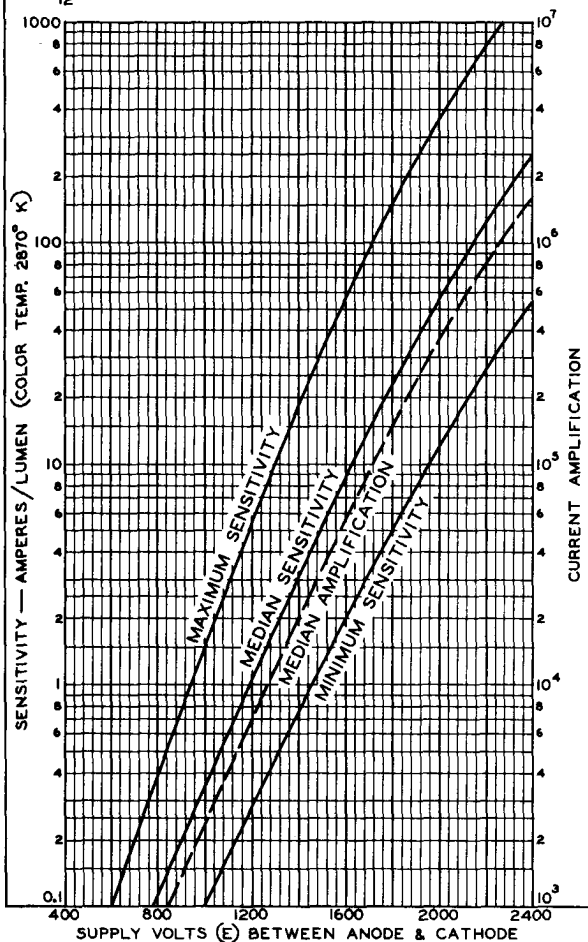
TYPICAL ANODE CHARACTERISTICS





CHARACTERISTICS

SUPPLY VOLTAGE (E) ACROSS VOLTAGE DIVIDER PROVIDING $\frac{1}{6}$ OF E BETWEEN CATHODE AND DYNODE N $\pm$ 1; $\frac{1}{8}$ OF E BETWEEN CATHODE AND FOCUSING ELECTRODE; $\frac{1}{12}$ OF E FOR EACH SUCCEEDING DYNODE STAGE; AND $\frac{1}{12}$ OF E BETWEEN DYNODE N $\pm$ 10 AND ANODE.

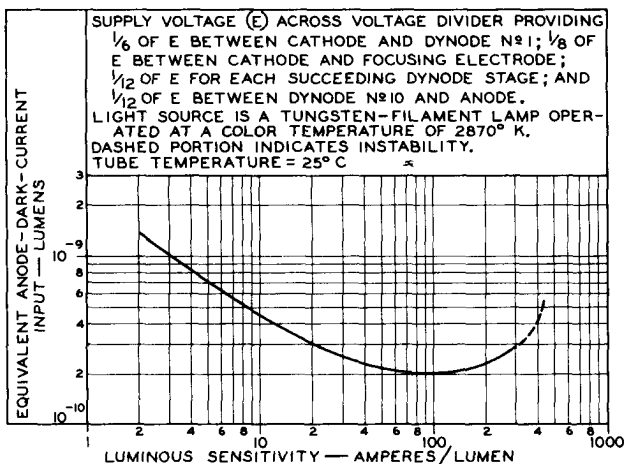




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TYPICAL ANODE-DARK-CURRENT CHARACTERISTIC



92CS-9841