Photomultiplier Tube

10-STAGE, CURVED-FACEPLATE TYPE HAVING S-10 RESPONSE
1-11/16 INCH MINIMUM DIAMETER CURVED PHOTOCATHODE

GENERAL

Spectral Response.................................................. S-10
Wavelength of Maximum Response.................. 4500 ± 300 angstroms
Cathode, Semitransparent................................. Ag-Bi-O-Cs
Shape.................................................. Curved, Circular
Minimum area............................................ 2.2 sq in
Minimum diameter.................................. 1-11/16 in
Window............................................. Lime Glass (Corning® No.0080), or equivalent
Index of refraction.................................. 1.51
Dynode Material........................................... Cs-Sb

Direct Interelectrode Capacitances (Approx.)
Anode to dynode No.10................................. 4.2 pF
Anode to all other electrodes.......................... 6.5 pF
Maxum Overall Length.................................. 5.81 in
Seatd Length........................................... 4.87 ± 0.19 in
Maxum Diameter....................................... 2.31 in
Operating Position.................................... Any
Weight (Approx.)........................................ 5.2 oz
Envelope.................................................. JEDEC T16
Base. Medium-Shell Diheptal 14-Pin (JEDEC Group 5, No.B14-38),
Magnetic Shield......................................... Eby® No.9709-7, or equivalent

ABSOLUTE-MAXIMUM RATINGS

DC or Peak AC Supply Voltage
Between anode and cathode............................. 1250 V
Between dynode No.10 and anode.................... 250 V
Between dynode No.1 and cathode.................... 300 V
Average Anode Current†................................. 0.75 mA
Ambient Temperature.................................. 75 °C

TERMINAL DIAGRAM (Bottom View)

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
Pin 12 – No Connection
Pin 13 – Do Not Use
Pin 14 – Photocathode

→ Indicates a change.
**CHARACTERISTICS RANGE VALUES**

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

With \(E = 1000\) V (Except as noted)

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiant, at 4500 angstroms</td>
<td>(-)</td>
<td>(5.1 \times 10^4)</td>
<td>(-)</td>
</tr>
<tr>
<td>Cathode radiant, at 4500 angstroms</td>
<td>(-)</td>
<td>0.02</td>
<td>(-)</td>
</tr>
<tr>
<td>Luminous, at 0 c/s(^e)</td>
<td>10</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>Cathode luminous with tungsten light source(^f)</td>
<td>(2 \times 10^{-5})</td>
<td>(4 \times 10^{-5})</td>
<td>(-)</td>
</tr>
<tr>
<td>Cathode luminous with red-infrared light source(^g)</td>
<td>(5 \times 10^{-8})</td>
<td>(-)</td>
<td>(-)</td>
</tr>
<tr>
<td>Current Amplification</td>
<td>(-)</td>
<td>(2.5 \times 10^6)</td>
<td>(-)</td>
</tr>
<tr>
<td>Equivalent Anode-Dark Current</td>
<td>(-)</td>
<td>(1.4 \times 10^{-9})</td>
<td>(2.5 \times 10^{-8})</td>
</tr>
<tr>
<td>Equivalent Noise Input</td>
<td>(-)</td>
<td>(4 \times 10^{-11})</td>
<td>(1.7 \times 10^{-10})</td>
</tr>
<tr>
<td>Dark Current</td>
<td>(-)</td>
<td>(-)</td>
<td>(7.5 \times 10^{-7})</td>
</tr>
</tbody>
</table>

With \(E = 750\) V (Except as noted)

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiant, at 4500 angstroms</td>
<td>(-)</td>
<td>(5.1 \times 10^3)</td>
<td>(-)</td>
</tr>
<tr>
<td>Cathode radiant, at 4500 angstroms</td>
<td>(-)</td>
<td>0.02</td>
<td>(-)</td>
</tr>
<tr>
<td>Luminous, at 0 c/s(^e)</td>
<td>(-)</td>
<td>10</td>
<td>(-)</td>
</tr>
<tr>
<td>Cathode luminous with tungsten light source(^f)</td>
<td>(2 \times 10^{-5})</td>
<td>(4 \times 10^{-5})</td>
<td>(-)</td>
</tr>
<tr>
<td>Cathode luminous with red-infrared light source(^g)</td>
<td>(5 \times 10^{-8})</td>
<td>(-)</td>
<td>(-)</td>
</tr>
<tr>
<td>Current Amplification</td>
<td>(-)</td>
<td>(2.5 \times 10^5)</td>
<td>(-)</td>
</tr>
</tbody>
</table>

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\(^a\) Made by Corning Glass Works, Corning, New York.
\(^b\) Made by Hugh H. Eby Company, 4701 Germantown Avenue, Philadelphia 44, Pa.
\(^c\) Made by JAN Hardware Manufacturing Company, 3801 Queens Blvd., Long Island City 1, New York.
\(^d\) Averaged over any interval of 30 seconds maximum. For best stability, the average anode current value should not exceed 100 microamperes.
\(^e\) Under the following conditions: The light source is a tungsten-filament lamp having a lime-glass envelope. It is operated at a color temperature of 2870°K and a light input of 10 microlumens is used.
\(^f\) Under the following conditions: The light source is a tungsten-filament lamp having a lime-glass envelope. It is operated at a color temperature of 2870°K. The value of light flux is 0.01 lumen and 167 volts are applied between cathode and all other electrodes connected as anode.
\(^g\) Under the following conditions: Light incident on the cathode is transmitted through a red-infrared filter (Combination of Corning C.S. Nos. 3-67 and 7-59, Glass Code No. 3492 and 5850, respectively) Manufactured by the Corning Glass Works, Corning, New York, from a tungsten-filament lamp operated at a color temperature of 2870°K. The value of light flux

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**DATA I**

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incident on the filter is 0.01 lumen and 167 volts are applied between
cathode and all other electrodes connected at anode.

At a tube temperature of 25°C. Prior to measurement, tube is stored in
dark for a period of 30 minutes. Dark current may be reduced by use of
a refrigerant.

Under the following conditions: Supply voltage (E) is as shown. 25°C tube
temperature, external shield connected to cathode, bandwidth 1 cycle per
second, tungsten-light source at a 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.

**DIMENSIONAL OUTLINE**

![Diagram of Photocathode Diameter](image)

**DIMENSIONS IN INCHES**

Center line of bulb will not deviate more than 2° in any di-
rection from perpendicular erected at the center of bottom of
the base.

**SPECTRAL-SENSITIVITY CHARACTERISTIC**

of Phototube having S-10 Response

is shown at the front of this Section

**TYPICAL ANODE CHARACTERISTICS**

are the same as those shown for Type 6199

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DATA 2

2-66
Typical Sensitivity and Current Amplification Characteristics

Supplied voltage (E) across voltage divider providing 1/6 of E between cathode and dynode No. 1, 1/12 of E for each succeeding dynode stage, and 1/12 of E between dynode No. 10 and anode.

Sensitivity—Amperes/lumen (color temp 2870° K)

Current amplification

Supply volts (E) between anode and cathode.