

SEPTEMBER 1960

7819

PHOTOMULTIPLIER

The CBS Type 7819 supersedes and is a direct replacement for CBS Type CL-1015. Type 7819 is a 10-stage, 5-inch diameter, end-on photomultiplier sensitive to the blue region of the spectrum. The faceplate is plano-concave with the photocathode deposited on the curved surface. This design insures good collection efficiency across the face of the tube. This tube utilizes a linear dynode structure with silver-magnesium dynodes.

Type 7819 is particularly well suited for use in scintillation counting when large crystals or large volumes of liquid scintillators are to be used. Other applications include use in flying spot scanners and photometric instruments.



GENERAL DATA

Spectral Response	S-11
Photocathode	Semi-transparent
Photocathode Window	Circular end-on type
Window Diameter	4.250 inches (min.)
Window Index of Refraction	1.51
Tube Diameter	5-1/4±3/16 inches
Overall Length	7-3/4±1/8 inches
Seated Height to Center of Window	7±1/8 inches
Mounting Position	Any
Base	Medium shell diheptal 14 pin (JETEC No. 814-38) Non-Hygroscopic
Wavelength at Maximum Response	4400±500 angstroms
Wavelength at 10% of Maximum Response on Long Wavelength Side	6125±275 angstroms
Wavelength at 10% of Maximum Response on Short Wavelength Side	3250±250 angstroms

MAXIMUM RATINGS

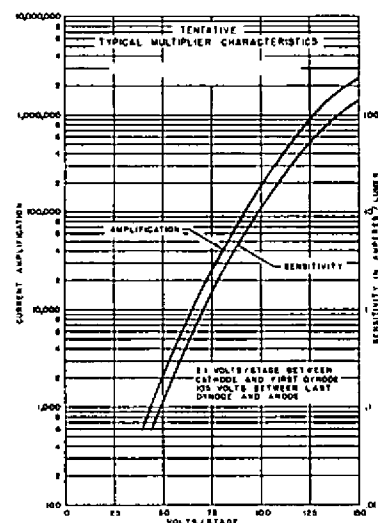
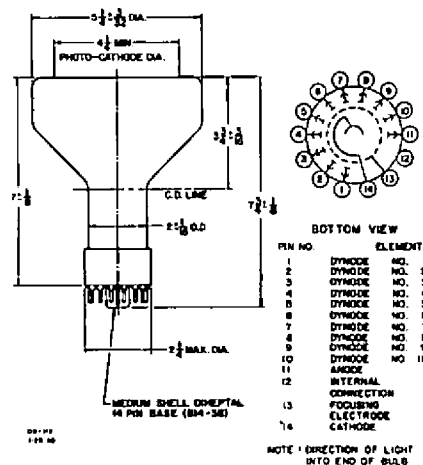
	Units
Supply Voltage (DC or peak AC) between Anode and Cathode	2000 volts
Supply Voltage (DC or peak AC) between Last Dynode and Anode	250 volts
Supply Voltage (DC or peak AC) between Cathode and First Dynode	400 volts
Supply Voltage (DC or peak AC) between Cathode and Focusing Electrode (See Note 5)	400 volts
Average Anode Current (See Note 6)	5 ma
Average Anode Dissipation (See Note 6)	1 watt
Environmental Conditions (Non-operating):	
Ambient Storage Temperature +75 °C	
Shock: 40 g, 11 ms. duration (See Note 7)	
Vibration: 0.35" double amplitude displacement: (See Note 8)	
	0-25 cycles
	10 g: 25-2000 cycles

CHARACTERISTIC ELECTRICAL DATA

	Min.	Avg.	Max.	Units
Cathode Radiant Sensitivity at 4400 Å		.060		$\mu\text{a}/\mu\text{w}$
Cathode Luminous Sensitivity	50	70		$\mu\text{a}/\text{lumen}$
Variation in Cathode Luminous Sensitivity over entire cathode (See Note 5)		± 20		%
Anode Radiant Sensitivity at 4400 Å, 1250 volts between cathode and anode (See Note 3)		1.2×10^{-2}		$\text{amp}/\mu\text{w}$
Anode Luminous Sensitivity 1250 volts between cathode and anode	4	13.5		amp/lumen
1750 volts between cathode and anode (See Notes 1, 3, 5)	30	120		amp/lumen
Last Dynode Luminous Sensitivity 1250 volts between cathode and anode		9		amp/lumen
1750 volts between cathode and anode (See Notes 1, 3)		90		amp/lumen
Current Amplification 1250 volts between cathode and anode		190,000		
1750 volts between cathode and anode (See Notes 3, 5)		2,000,000		
Equivalent Anode Dark Current Input (See Notes 1, 4)		2×10^{-10}	2×10^{-9}	lumen
Interelectrode Capacitances				
a) Anode to all other electrodes		3.2		μmf
b) Anode to last dynode		2.8		μmf

NOTES

- Note 1: The light source is a tungsten filament lamp operated at a color temperature of 2870°K.
- Note 2: Measured at 0 cps with 210 volts applied between cathode and all other electrodes connected together.
- Note 3: The applied voltage, V, is distributed in the following manner: 1/6 of V between cathode and dynode 1, 1/12 of V between succeeding dynodes, 1/12 of V between dynode 10 and anode. Improved pulse energy resolution and gain stability can be obtained if voltage between cathode and dynode 1 is set at three to four times that between succeeding stages.
- Note 4: Measured at 25°C with supply voltage adjusted to give an anode luminous sensitivity of 20 amperes per lumen.
- Note 5: The focusing electrode should be varied between photocathode and dynode 1 potentials for optimum photoelectron collection efficiency. Best gain and pulse energy resolution are usually obtained with shield potential above cathode 20% of cathode — dynode 1 potential. Best uniformity of cathode response is usually obtained with shield at cathode potential.
- Note 6: Average over a 30 second interval maximum.
- Note 7: Test performed, with no voltage applied, in each of three orthogonal axes. Reference axis is through Pins 2 and 9 on tube base.
- Note 8: Test performed, with no voltage applied, through three complete cycles at three minutes per cycle in each of three orthogonal axes. Reference axis is through Pins 2 and 9 on tube base.



TENTATIVE AVERAGE ANODE CHARACTERISTIC

