

A standard fast, high gain, 12-stage, 51mm (2") tube

Applications :	High and medium energy physics. Radiation detection.		
Description :	Window :	Material :	lime glass
		Photocathode :	bi-alkali
		Refr. index at 420 nm :	1.54
	Multiplier :	Structure :	linear focused
		Nb of stages :	12
	Mass :		130 g

Photocathode characteristics

Spectral range :		290-650	nm
Maximum sensitivity at :		420	nm
Sensitivity ① :			
<input checked="" type="checkbox"/> Luminous :		typ.: 70	µA/lm
<input checked="" type="checkbox"/> Blue :	min.: 9	typ.: 11	µA/lmF
<input checked="" type="checkbox"/> Radiant, at 400 nm :		typ.: 90	mA/W

Characteristics with voltage divider A

Gain slope (vs supp. volt., log/log)		8.8	
For a gain of :		3.0x10 ⁷	
<input checked="" type="checkbox"/> Supply voltage :	max.: 2000 min.: 1100	typ.: 1400	V
<input checked="" type="checkbox"/> Anode dark current ② :		typ.: 10	nA
<input checked="" type="checkbox"/> Background noise ③ :	max.: 6000	typ.: 1000	cps
Single electron spectrum ④ resolution :		typ.: 70	%
peak to valley ratio :		typ.: 3	
Mean anode sensitivity deviation :			
long term (16 h) :		typ.: 1	%
after change of count rate :		typ.: 1	%
vs temperature between 0 and +40°C at 400 nm :		typ.: -0.2	%/K
Gain halved for a magnetic field of :			
perpendicular to axis "n" :		0.2	mT
parallel to axis "n" :		0.1	mT

Characteristics with voltage divider ⑤ :

For a supply voltage of :		1600	V
Gain :		10 ⁸	
Linearity (2%) of an. current up to :		80	mA
Anode pulse ⑥ :	Rise time :	2.5	ns
	Duration at half height :	4.0	ns
	Transit Time :	34	ns
	Transit Time Difference between centre of PK and 18mm from it :	0.8	ns
Capacitance	anode to all dynodes :	5	pF

photomultiplier tubes

preliminary product specification

XP2222

Recommended voltage divider

Type A for maximum gain

K	D1	D2	D3	D4	D6	D7	D8	D9	D10	D11	D12	A	
4	1.1	0.9	1	1	1	1	1	1	1	1	1	1	(total : 16)

K : photocathode Dn : dynode A : anode

Limiting values

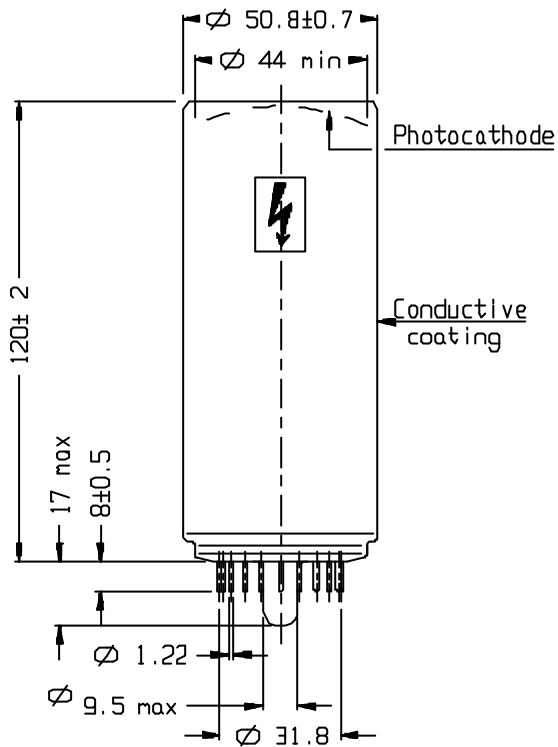
Anode luminous sensitivity :													max.:	5x10 ⁸			
Supply voltage :													max.:	2200	V		
Continuous anode current :													max.:	0.2	mA		
Voltage between :																	
	D1 and photocathode :												min.:	250	max.:	600	V
	consecutive dynodes :														max.:	350	V
	anode and D12 :												min.:	60	max.:	500	V
	short operation (< 30 mn) :												min.:	-30	max.:	+80	°C
	continuous operation & storage :												min.:	-30	max.:	+50	°C

Notes

Characteristic measured and mentioned on the test ticket of each tube.

- ① Luminous sensitivity is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. The blue radiant blue sensitivity expressed in A/lmF ("F" as filtered) is measured with a tungsten filament lamp with a colour of 2856 ± 5 K transmitted through a blue filter Corning Cs N°5-58, polished to half stock thickness.
- ② Dark current is measured at ambient temperature, after the tube has been in darkness for approximately 1 min. Lower value can be obtained after a longer stabilisation period in darkness (approx. 30 min.).
- ③ Noise is measured at ambient temperature. After having been stored with its protection hood, the tube is placed in darkness operated at a gain of 3×10^7 . After a 30mn stabilisation period, noise pulses above a threshold of 1 pC (corresponding to 0.2 photoelectron) are recorded.
- ④ The peak to valley ratio is defined as the single electron peak value divided by the minimum value to the left of the peak.
- ⑤ To obtain a peak pulse current greater than that obtainable with divider A, it is necessary to increase the inter-dynode voltage progressively. Different dividers can be conceived to achieve other compromises. It is generally recommended that the voltage ratio between two successive stages is less than 2.
- ⑥ Measured with a pulse light source, with a pulse duration (FWHM) of approximately 1ns., the cathode being completely illuminated. The rise time is determined between 10 % and 90 % of the anode pulse amplitude. The signal transit time is measured between the instant at which the illuminating pulse of the cathode becomes maximum, and the instant at which the anode pulse reaches its maximum. Rise time, pulse duration and transit time vary with respect to high tension supply voltage V_{ht} as $(V_{ht})^{-1/2}$.

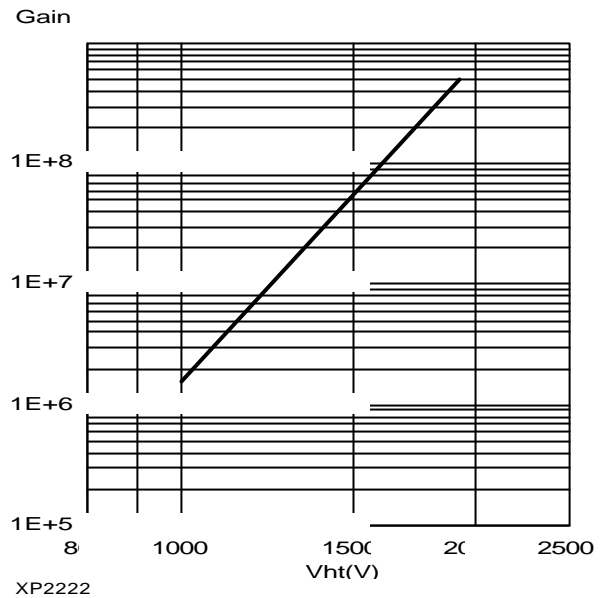
Note : The envelope of the tube is covered with a conductive coating connected to the photocathode on top of which a black paint is applied. This paint is neither guaranteed to be light-tight nor electrically insulating. Care should be taken to avoid electrical shock.



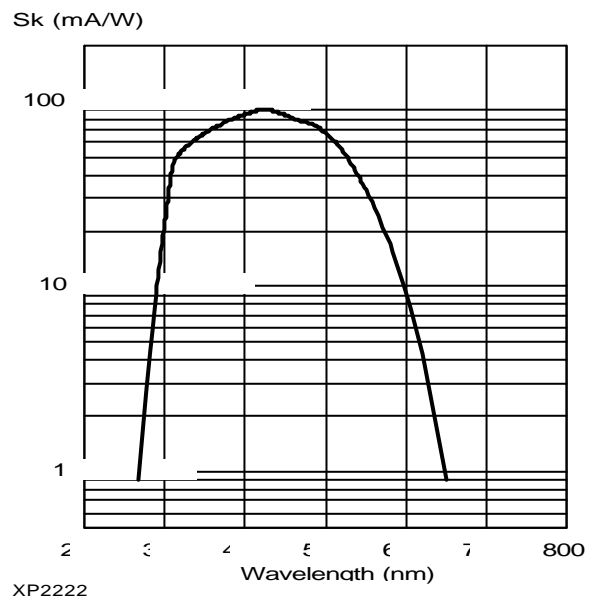
Ref.: 99902002
 nc: not connect
 n: plane of symmetry of the multiplier

K: cathode Dn: dynode
 A: anode

Typical gain curve



Typical spectral characteristics



Accessories

Socket : FE1120
 Mu-metal shield: MS172