

Very fast , UV sensitive, 8-stage, 51 mm (2") round tube

Applications :	High and medium energy physics, time of flight PET applications and fast crystals scintillation detection. This tube features a good linearity, a good gain stability at high count rates, double anode for optimised time resolution, a good single electron spectrum, and a high energy resolution.		
Description :	Window :	Material :	fused silica
	Photocathode :		bi-alkali
		Refr. index at 420 nm :	1.50 at 200 nm
	Multiplier :	Structure :	linear focused
		Nb of stages :	8
	Mass :		210 g

Photocathode characteristics

Spectral range :				150-650	nm
Maximum sensitivity at :				420	nm
Sensitivity ① :	Luminous :			90	μA/lm
<input checked="" type="checkbox"/>	Blue :	min.:	9	typ.:	11 μA/lmF
	Radiant, at 420 nm :			typ.:	90 mA/W

Characteristics with voltage divider A

Gain slope (vs supp. volt., log/log) :				5.6	
For an anode sensitivity of :				3	A/lmF
Gain of :				2.7x10 ⁵	
<input checked="" type="checkbox"/> Supply voltage :		max.:	1200	typ.:	1050 V
		min.:	800		
<input checked="" type="checkbox"/> Anode dark current ② :		max.:	20	typ.:	1 nA
Single electron spectrum resolution :				typ.:	70 %
peak to valley ratio ③ :				typ.:	2.5
Gain halved for a magnetic field of :					
	perpendicular to axis "n" :			0.15	mT
	parallel with axis "n" :			0.12	mT

Characteristics with voltage divider A ④ :

For a supply voltage of :				2000	V
Gain :				10 ⁷	
Linearity (2%) of anode current up to ④ :				80	mA
Anode pulse ⑤:	Rise time :			1.5	ns
	Duration at half height :			2.2	ns

photomultiplier tubes

preliminary product specification

XP20Z8

Recommended voltage divider

Type A for maximum gain

K	G1	D1	D2	D3	D4	D5	D6	D7	D8	A1	A2	
1.8	4.2	1.25	1.75	1	1	1	1	1	1			(total :15)

K: photocathode G1: focusing electrode Dn: dynode
A1: anode signal
A2: grid for timing improvement (to be adjusted between D7 and D8)
G2 has to be externally connected to D5

Limiting values

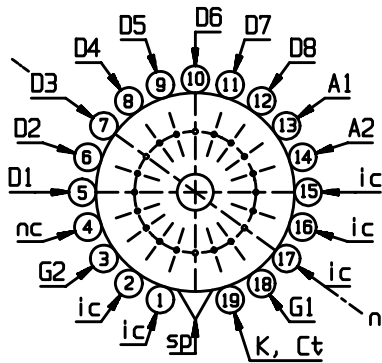
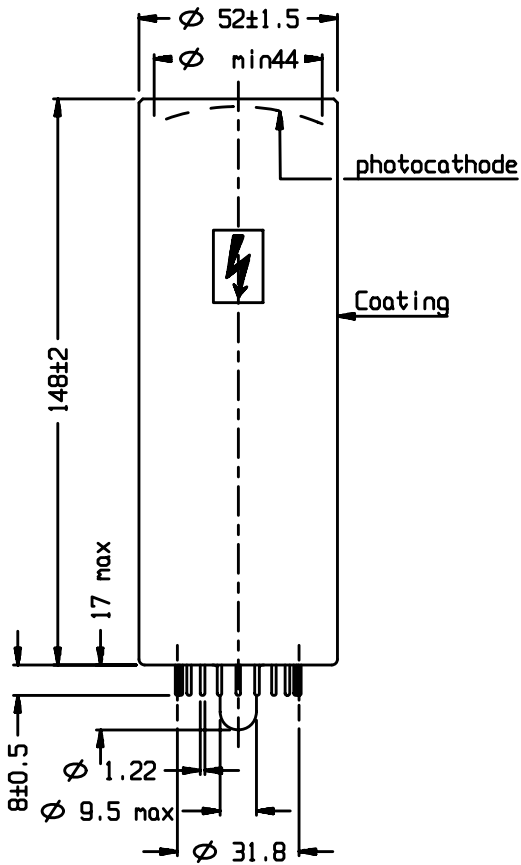
Anode sensitivity :		max.:	150	A/lmF		
	Supply voltage :	max.:	2400	V		
	Continuous anode current :	max.:	0.2	mA		
Voltage between :	G and photocathode :	max.:	250	V		
	first dynode and PK :	min.:	160	max.: 800	V	
	consecutive dynodes :	max.:	350	V		
	anode and D8 :	min.:	40	max.: 350	V	
Ambient temperature	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 sensitivity, expressed in A/lmF ("F" as in Filtered) is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. Light is transmitted through a blue filter Corning CS no.5-58, polished to half stock thickness. The radiant sensitivity is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. Light is transmitted through an interference filter. Radiant sensitivity at 420 nm, expressed in mA/W, can be estimated by multiplying the blue sensitivity, expressed in μ A/lmF, by 8 for this type of tube.
- 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 The peak to valley ratio is defined as the single electron peak value divided by the minimum value at the left of the peak.
- ④ To obtain a peak pulse current greater than that obtainable with divider A, it is necessary to increase the inter-dynode voltage progressively. Divider circuit C is an example of a progressive divider, giving a compromise between gain, speed and linearity. other dividers can be conceived to achieve other compromises. It is generally recommended that the voltage ratio between two successive stages is less than 2.
- ⑤ Measured with a pulse light source, with a pulse duration (FWHM) of approximately 1 ns., 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 $(V_{ht})^{-1/2}$.

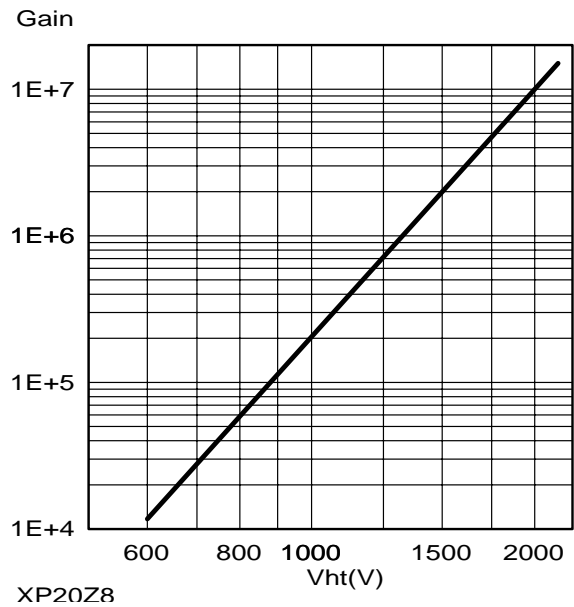
The envelope of the tube is covered with a conductive coating connected to the cathode. On top of this, a black paint is applied which is neither guaranteed to be light-tight nor isolating. Care should be taken to avoid electric shock.



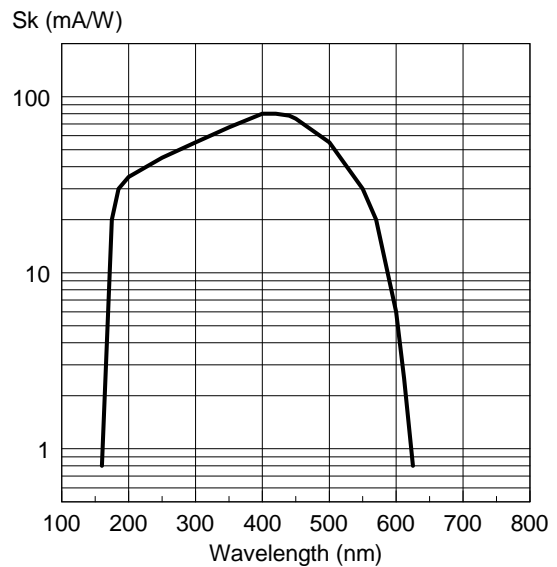
ref.: 99902816
 K : cathode Dn : dynode Ct : coating
 A1 : anode A2 : anode grid
 nc : not connected
 ic : internal connection
 sp : short pin
 n : plane of symmetry of the multiplier

G1, G2: focusing electrodes

Typical gain curve



Typical spectral characteristics



Accessories

Socket : FE2019
 Mu-metal shield : MS172