A standard fast, 8-stage, 51mm (2") tube

Applications :	High and medium energy physics.		
Description :	Window :	Material :	lime glass
		Photocathode :	bi-alkali
		Refr. index at 420 nm :	1.54
	Multiplier :	Structure :	linear focused
		Nb of stages :	8
	Mass :	120 g	

Photocathode characteristics

	Spectral range :					290-650	nm
		Maximum sensitivity at :				420	nm
	Sensitivity ① :						
		Luminous :			typ.:	90	µA/lm
☑		Blue :	min.:	9	typ.:	11	µA/lmF
		Radiant, at 400 nm :			typ.:	90	mA/W

Characteristics with voltage divider A

	Gain slope (vs supp. volt., log/log) :					5.6	
	For a gain of :					10^6	
☑	Supply voltage :		max.:	2200	typ.:	1900	V
			min.:	1600			
☑	Anode dark current ② :		max.:	20	typ.:	10	nA
	Pulse height resolution ^{137}Cs ③ :				typ.:	7.2	%
	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
		parallel to tube axis :				0.3	mT

Characteristics with voltage divider ④ :

				C	**B**	**A**	
	For a supply voltage of :			2500	2500	2500	V
	Gain :			$3x10^6$	10^6	$4.5x10^6$	
	Linearity (2%) of anode current up to :			180	180	100	mA
	Anode pulse ⑤ :						
		Rise time :		1.5	1.6	1.6	ns
		Duration at half height :		2.2	2.4	2.4	ns
		Transit Time :		19	20	19	ns
		Transit Time Difference between centre of PK and 18 mm from it :		0.5	0.7		ns
	Capacitance	anode to all dynodes :				5	pF

Recommended voltage divider

Type A for maximum gain

K	D1	D2	D3	D4	D5	D6	D7	D8	A	
3	1	1	1	1	1	1	1	1		(total : 11)

Type B for best timing / linearity compromise

K	D1	D2	D3	D4	D5	D6	D7	D8	A	
3	1	1	1	1.5	2	2	3	2.25		(total : 16.75)

Type C for best timing / linearity / gain compromise

K	D1	D2	D3	D4	D5	D6	D7	D8	A	
3	1	1	1	1	1	1.25	1.75	1.25		(total : 12.25)

K: photocathode Dn: dynode A: anode

Limiting values

Gain :				max.:	$5x10^6$	
Supply voltage :				max.:	3000	V
Continuous anode current :				max.:	0.2	mA
Voltage between :						
	D1 and photocathode :	min.:	200	max.:	750	V
	consecutive dynodes :			max.:	500	V
	anode and D8 :	min.:	30	max.:	500	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 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.

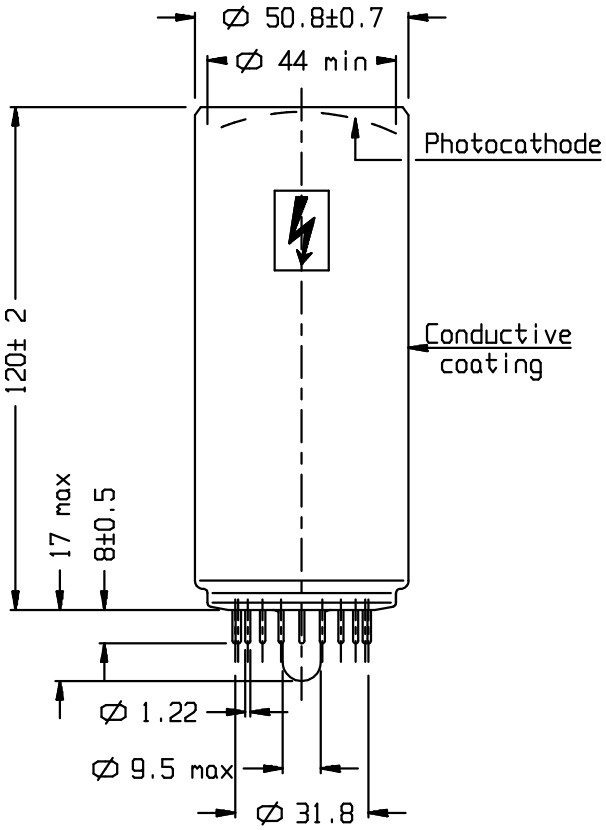
② Dark current is measured at ambient temperature, after the tube has been in darkness for approximately 1 min. Lower value can be obtained after a longer stabilisation period in darkness (approx. 30 min.).

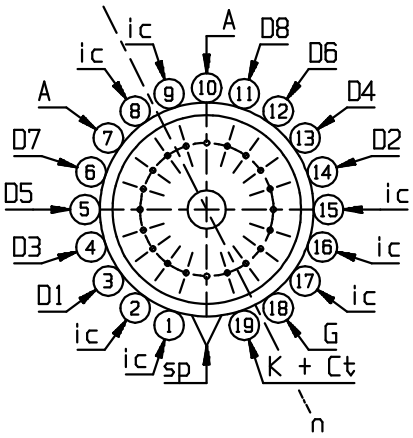
③ Pulse amplitude for ^{137}Cs is measured with NaI(Tl) cylindrical scintillator with a diameter of 51mm and a height of 51mm. The count rate used is ~ 10^4 cps.

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 B is an example of a progressive divider, giving an optimisation of 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 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 Vht as (Vht)-½.

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.

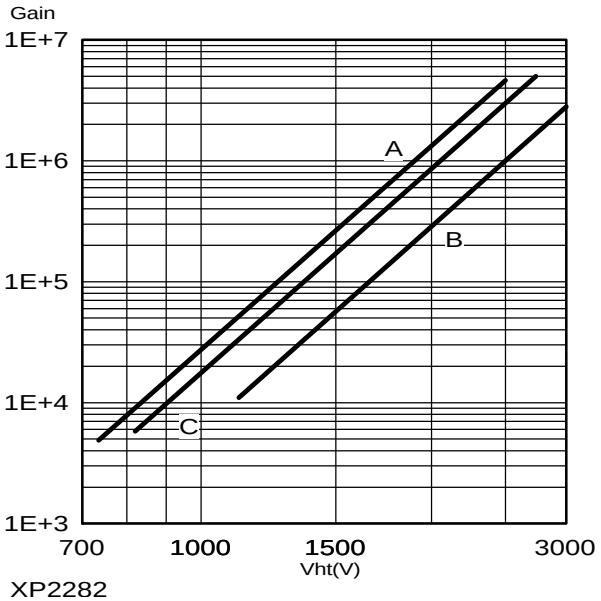




ref.: 51100011
sp: short pin
ic: internal connection
n: plane of symmetry of the multiplier

K: cathode Dn: dynode
A: anode

Typical gain curve



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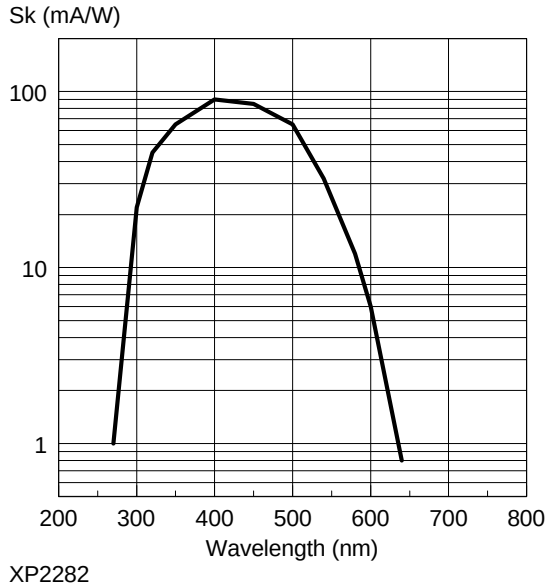
Typical spectral characteristics



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Accessories

Socket :	FE2019
Mu-metal shield:	MS172

PHOTONIS imaging sensors