A tube for hot environment, 10-stage, 51mm (2") tube

Applications :	For scintillation counting and industrial photometry in high temperature environment up to 130°C. *(Unless otherwise stated, all characteristics are given at 20°C)*		
Description :	Window :	Material :	borosilicate glass
		Photocathode :	high temperature bi-alkali
		Refr. index at 420 nm :	1.48
	Multiplier :	Structure :	linear focused
		Nb of stages :	10
	Mass :	110 g	

Photocathode characteristics

	Spectral range :					270-650	nm
		Maximum sensitivity at :				420	nm
	Sensitivity ① :	Luminous :			typ.:	40	µA/lm
☑		Blue :	min.:	5	typ.:	7	µA/lmF
		Blue at 130°C :			typ.:	5.5	µA/lmF
		Radiant, at 400 nm :			typ.:	50	mA/W

Characteristics with voltage divider A

	Gain slope (vs supp. volt., log/log) :					7	
	For an anode blue sensitivity of :					1.5	A/lmF
☑	Supply voltage :		max.:	1600	typ.:	1300	V
			min.:	1000			
	Gain :					$2.1x10^5$	
☑	Anode dark current ② :		max.:	10	typ.:	1	nA
	Anode dark current at 130°C :				typ.:	15	nA
	Pulse height resolution ^{137}Cs ③ :				typ.:	8.5	%
	Mean anode sensitivity deviation ④ :						
		long term (16 h) :				1	%
		after change of count rate :				1	%
		vs temperature between 0 and +40 °C at 420 nm :				- 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 A ⑤ :

For a supply voltage of :		1300	V
Gain :		$2.1x10^5$	
Linearity (2%) of anode current up to :		100	mA
Anode pulse ⑥ :			
	Rise time :	4	ns
	Duration at half height :	8	ns
	Transit Time :	36	ns
Capacitance	anode to all :	5	pF

Recommended voltage divider

Type A for maximum gain

K	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	A	
2	1	1	1	1	1	1	1	1	1	1		(total :12)

K: photocathode Dn: dynode A: anode

Limiting values

Anode luminous sensitivity :				max.:	15	A/lmF
Supply voltage :				max.:	1700	V
Continuous anode current :				max.:	0.2	mA
Voltage between :						
	D1 and photocathode :	min.:	150	max.:	600	V
	consecutive dynodes :			max.:	300	V
	anode and D10 :	min.:	30	max.:	300	V
Ambient temperature :						
	short operation (< 30 mn) :	min.:	-30	max.:	+130	°C
	continuous operation & storage :	min.:	-30	max.:	+130	°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 an interference filter.

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.).

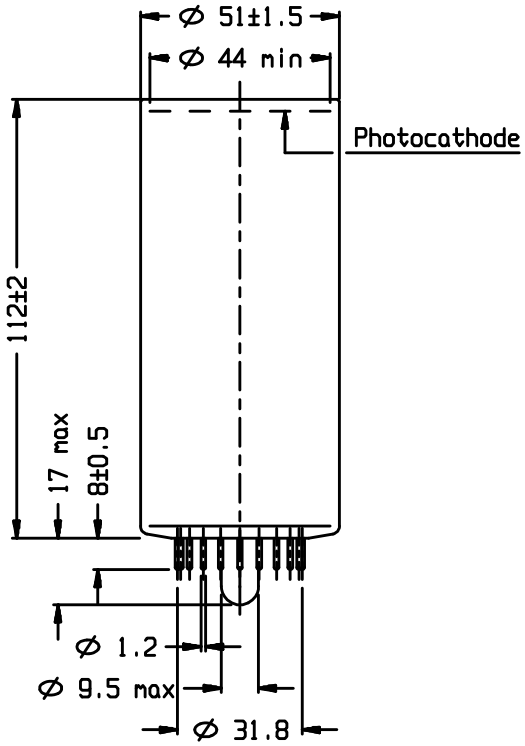
③ Pulse amplitude resolution for ^{137}Cs is measured with a NaI(Tl) cylindrical scintillator with a diameter of 50 mm and a height of 50 mm. The count rate used is about 10^4 cps.

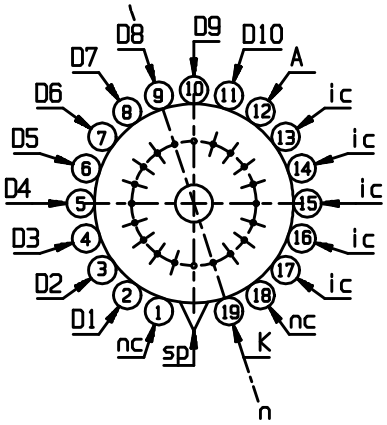
④ The mean pulse amplitude deviation is measured by coupling a NaI(Tl) scintillator to the window of the tube. Long term (16h) deviation is measured by placing a ^{137}Cs source at a distance from the scintillator such that the count rate is ~ 10^4 c/s, corresponding to an anode current of ~ 300 nA. The mean pulse amplitude deviation after change of count rate is measured with a ^{137}Cs source at a distance from the scintillator such that the count rate can be changed from 10^4 to 10^3 c/s, corresponding to an anode current of ~ 1 µA and 0.1 µA respectively. Both tests are carried out according to ANSI-N42-9-1972 of IEEE recommendations.

⑤ 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.

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 Vht as (Vht)-½.

product specification

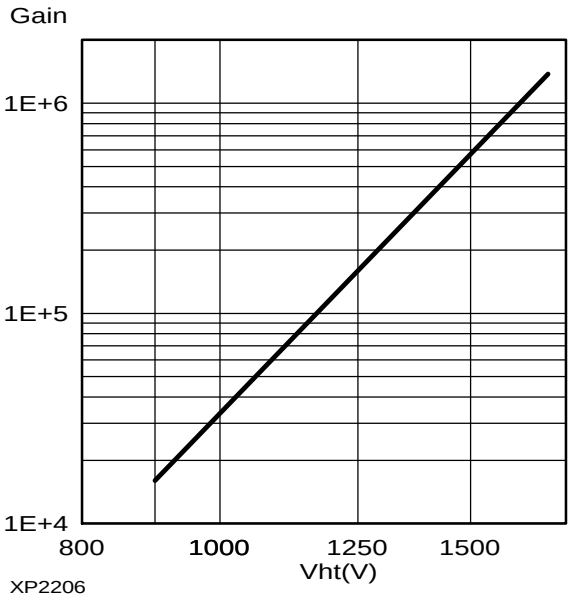




Ref.: 08800009
sp: short pin
nc: not connected
ic: internal connection
n: plane of symmetry of the multiplier

K: cathode D: dynode
A: anode

Typical gain curve



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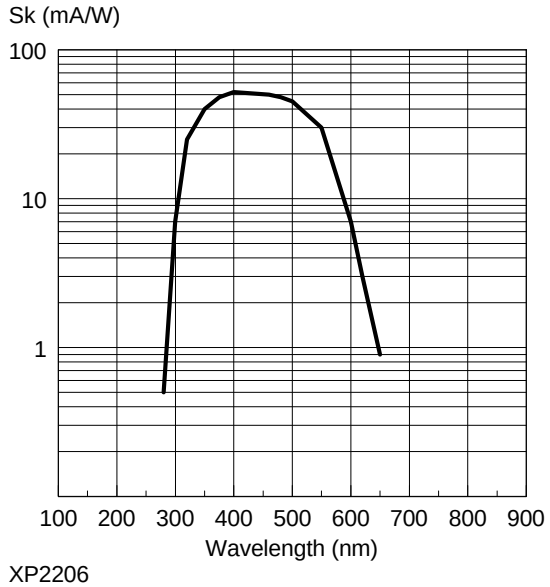
Typical spectral characteristics



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Accessories

Socket:	FE2019
Mu-metal shield:	MS152

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