

**Standard, 8-stage, 39 mm (1.5") round tube**

<b>Applications :</b>	All photometry and scintillation counting applications where a good energy resolution and limited gain are required		
<b>Description :</b>	Window :	Material :	borosilicate glass
		Photocathode :	bi-alkali
		Refr. index at 420 nm :	1.48
	Multiplier :	Structure :	linear focused
		Nb of stages :	8
	Mass :		55 g

**Photocathode characteristics**

Spectral range :		270-650	nm
Maximum sensitivity at :		420	nm
Sensitivity ① :			
<input checked="" type="checkbox"/> Luminous :		100	μA/lm
<input checked="" type="checkbox"/> Blue :	min.: 10	typ.: 11.5	μA/lmF
<input checked="" type="checkbox"/> Radiant, at 420 nm :		typ.: 90	mA/W

**Characteristics with voltage divider A**

Gain slope (vs supp. volt., log/log) :		6	
For an anode blue sensitivity of :		3	A/lmF
<input checked="" type="checkbox"/> Supply voltage :	max.: 1100	typ.: 900	V
	min.: 700		
Gain :		2.6x10 <sup>5</sup>	
<input checked="" type="checkbox"/> Anode dark current ② :	max: 10	typ.: 2	nA
Pulse height resolution for <sup>137</sup> Cs ③ :		7	%
Pulse height resolution for <sup>55</sup> Fe ③ :		37	%
Peak to valley ratio for <sup>55</sup> Fe :		40	
Mean anode sensitivity deviation ④ :			
Long term (16 h) :		0.6	%
After change of count rate :		1	%
Vs temperature between 0 and +40°C at 420 nm :		- 0.3	%/K
Gain halved for a magnetic field			
Perpendicular to axis "n" of :		0.12	mT
Parallel to axis "n" :		0.3	mT
Parallel to tube axis :		0.5	mT

**Characteristics with voltage divider A ⑤ :**

For a supply voltage of :		900	V
Gain :		2.6x10 <sup>5</sup>	
Linearity (2%) of anode current up to :		50	mA
Anode pulse ⑥	Rise time :	2.6	ns
	Duration at half height :	6	ns
	Transit Time :	30	ns
Capacitance	Anode to all :	5	pF

Recommended voltage divider

Type A for maximum gain

K D1 D2 D3 D4 D5 D6 D7 D8 A (total: 11)  
2 2 1 1 1 1 1 1 1

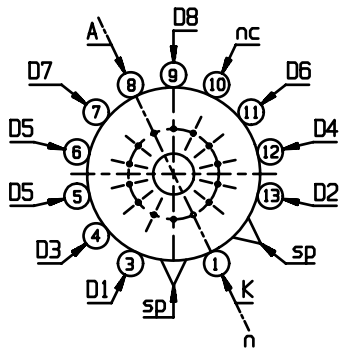
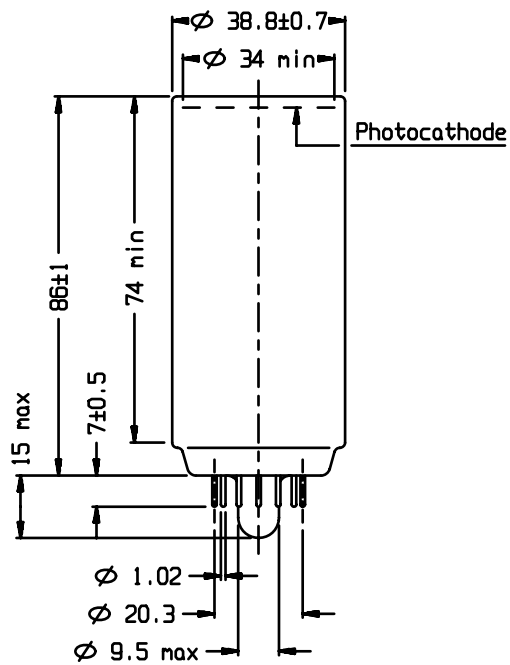
K : photocathode Dn : dynode A : anode

Limiting values

Anode luminous sensitivity :				max.:	30	A/lmF
Supply voltage :				max.:	1400	V
Continuous anode current :				max.:	0.2	mA
Voltage between	D1 and photocathode :	min.:	80	max.:	400	V
	consecutive dynodes :			max.:	300	V
	anode and D10 :	min.:	30	max.:	300	V
Ambient temperature	short operation (< 30 mn) :	min.:	-30	max.:	+80	°C
	continuous operation & storage :	min.:	-30	max.:	+50	°C

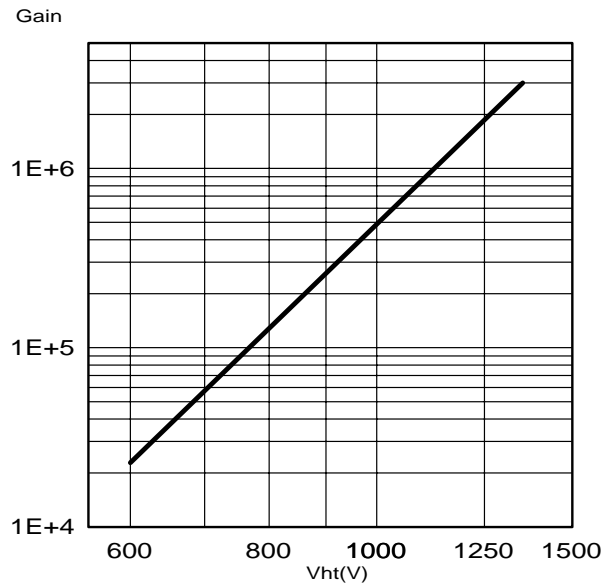
Notes  Characteristic measured and mentioned on the test ticket of each tube.

- ① Luminous sensitivity is measured with a tungsten filament lamp with a color temperature of  $2856 \pm 5$  K. The blue sensitivity, expressed in A/lmF ("F" as in Filtered) is measured with a tungsten filament lamp with a color temperature of  $2856 \pm 5$  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 color temperature of  $2856 \pm 5$  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  $\mu$ A/lmF, by 7.5 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 stabilization period in darkness (approx. 30 min.).
- ③ Pulse amplitude resolution for  $^{137}\text{Cs}$  and  $^{57}\text{Co}$  is measured with NaI(Tl) cylindrical scintillator with a diameter of 32 mm and a height of 25 mm. The count rate used is  $\sim 10^4$  c/s. The pulse amplitude for  $^{55}\text{Fe}$  is measured with a NaI(Tl) cylindrical scintillator with a diameter of 25 mm and a height of 1 mm provided with a beryllium window. The count rate used is  $\sim 10^4$  c/s.
- 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  $^{137}\text{Cs}$  source at a distance from the scintillator such that the count rate is  $\sim 10^4$  c/s, corresponding to an anode current of  $\sim 300$  nA. The mean pulse amplitude deviation after change of count rate is measured with a  $^{137}\text{Cs}$  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  $\sim 1$   $\mu$ A and 0.1  $\mu$ A 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 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 Vht as  $(Vht)^{-1/2}$ .

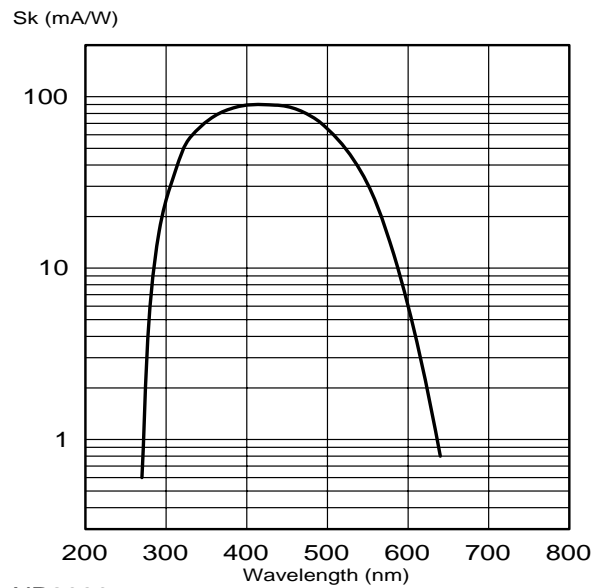


ref. 99902786  
 sp: short pin  
 n: plane of symmetry of the multiplier  
 K: cathode                      Dn: dynode  
 A: anode

Typical gain curve



Typical spectral characteristics



Accessories

Socket for wires : FE1112  
 Mu-metal shield : MS170