51 mm (2") photomultiplier
7216B series data sheet (provisional)

ET Enterprises electron tubes

1 description

The 7216B is a compact 51mm (2") diameter, end window photomultiplier with blue-green sensitive high QE bialkali photocathode and 10 high gain, high stability, SbCs dynodes of linear focused design for good linearity and timing. It is the high QE version of the 9216.

2 applications

- wide range of applications
- x-ray and gamma-ray
- scintillation
- photon counting

3 features

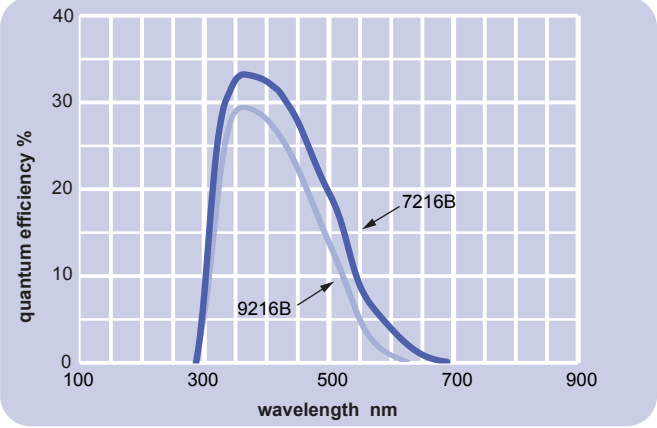
- high QE photocathode
- good SER
- high pulsed linearity
- low rate effect
- compact length

4 window characteristics

	7216B borosilicate
spectral range**(nm)	290 - 630
refractive index (n_d)	1.49
K (ppm)	300
Th (ppb)	250
U (ppb)	100

* note that the sidewall of the envelope contains graded seals of high K content
** wavelength range over which quantum efficiency exceeds 1 % of peak

5 typical spectral response curves

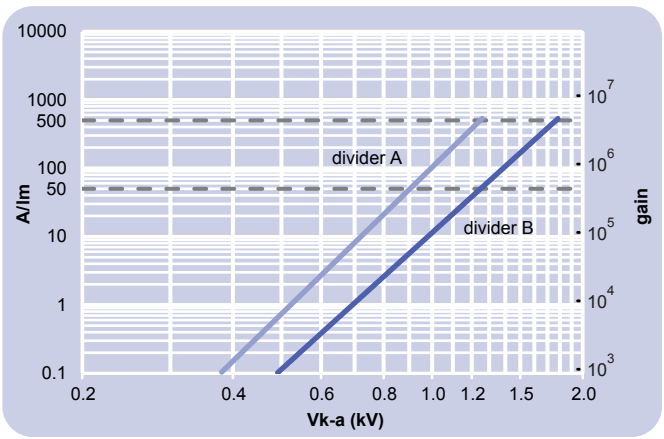


6 characteristics

	unit	min	typ	max
photocathode: bialkali				
active diameter	mm		48	
quantum efficiency at peak	%		33	
luminous sensitivity	µA/lm		115	
with CB filter		12	14	
with CR filter			10	
dynodes: 10LFSbCs				
anode sensitivity in divider A:				
nominal anode sensitivity	A/lm		50	
max. rated anode sensitivity	A/lm		500	
overall V for nominal A/lm	V		900	1300
overall V for max. rated A/lm	V		1200	
gain at nominal A/lm	x 10^6		1	
dark current at 20 °C:				
dc at nominal A/lm	nA		1	5
dc at max. rated A/lm	nA		10	
dark count rate	s^{-1}		2000	
pulsed linearity (-5% deviation)				
divider A	mA		25	
divider B	mA		100	
rate effect (I_a for $\Delta g/g$=1%):	µA		20	
magnetic field sensitivity:				
the field for which the output decreases by 50% most sensitive direction	T x 10^{-4}		1.3	
temperature coefficient	% $°C^{-1}$		±0.5	
timing:				
multi electron rise time	ns		5	
multi electron fwhm	ns		12	
single electron rise time	ns		3	
single electron fwhm	ns		5	
transit time	ns		40	
weight:				
hard pin	g		90	
capped	g		120	
maximum ratings:				
anode current	µA			100
cathode current	nA			100
gain	x 10^6			4
sensitivity	A/lm			500
temperature	°C	-30		60
V (k-a)(1)	V			2000
V (k-d1)	V			300
V (d-d)(2)	V			300
ambient pressure (absolute)	kPa			202

(1) subject to not exceeding max. rated sensitivity (2) subject to not exceeding max rated V(k-a)

7 typical voltage gain characteristics



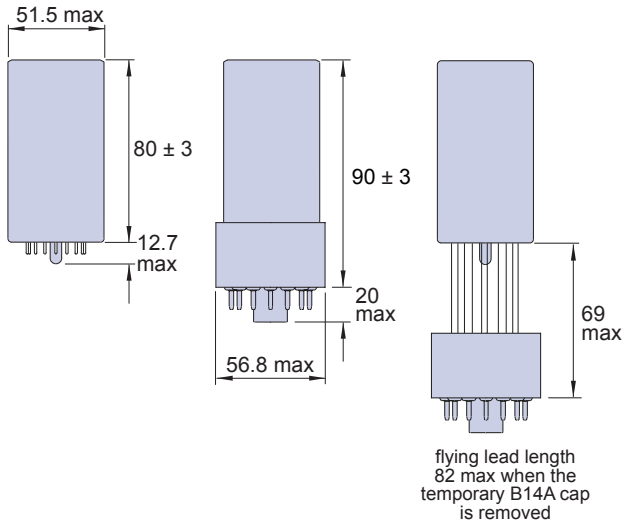
8 voltage divider distribution

	k	d_1	d_2	.....	d_7	d_8	d_9	d_{10}	a	
A	2R	R		.....	R	R	R	R	R	Standard
B	2R	R		.....	R	1.25R	1.5R	2R	3R	High Pulsed linearity

Characteristics contained in this data sheet refer to divider A unless stated otherwise.

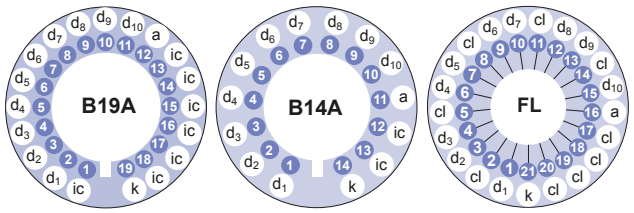
9 external dimensions mm

The drawings below show the 7216B in hardpin format, the 7216KB with the B14A cap fitted and the 7216FLB in flying lead format with the temporary B14A cap fitted. The cap is attached as agreed with the customer.



flying lead length 82 max when the temporary B14A cap is removed

10 base configuration (viewed from below)



B19A hardpin base (for 7216B) 'ic' indicates an internal connection

B14A cap (for 7216KB)

flying lead base (for 7216FLB) after removal of temporary cap 'cl' indicates cut lead

Our range of B14A sockets is available to suit the temporary B14A cap when the flying lead base variant is selected. The socket range include versions with or without a mounting flange, and with contacts for mounting directly onto printed circuit boards.

11 ordering information

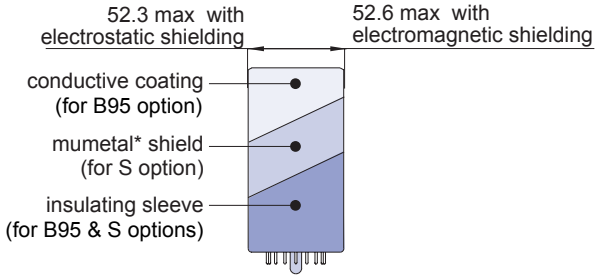
The 7216B meets the specification given in this data sheet. You may order **variants** by adding a suffix to the type number. You may also order **options** by adding a suffix to the type number. You may order product with **specification options** by discussing your requirements with us. If your selection option is for a one-off order, then the product will be referred to as 7216A. For a repeat order, ET Enterprises Limited will give the product a two digit suffix after the letter B, for example B21. This identifies your specific requirement.

7216 ☐ ☐ ☐

base options
- **K** capped
- **KFL** flying lead base with temporary B14A cap

options
- **B95** electrostatic shielding see drawing below
- **S** electromagnetic shielding see drawing below
- **M** supplied with spectral response calibration

specification options
- **B** as given in data sheet
- **A** single order to selected specification
- **Bnn** repeat order to selected specification



*mumetal is a registered trademark of Magnetic Shield Corporation

12 voltage dividers

The standard voltage dividers available for all variants of these pmts are tabulated below:

B	7216 KB	FLB	k	d_1	d_2	.....	d_6	d_7	d_8	d_9	d_{10}	a
C647A	C636A	C655A	2R	R		.....	R	R	R	R	R	
C647U	C636U	C655U	2R	R		.....	R	1.25R	1.5R	2R	3R	
C647C	C636C	C655C	150 V	R		.....	R	R	R	R	R	
C647V	C636V	C655V	150 V	R		.....	R	1.25R	1.5R	2R	3R	

R = 330 kΩ

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