

INCH-POUND

MIL-E-1/1519B  
17 January 2014  
SUPERSEDING  
MIL-E-1/1519A  
6 January 1971

MILITARY SPECIFICATION SHEET  
ELECTRON TUBE, NUMERICAL INDICATOR  
TYPE 8422

Inactive for new  
design after  
30 April 1997.

This specification is approved for use by all Departments  
and Agencies of the Department of Defense.

The requirements for acquiring the electron tube described  
herein shall consist of this specification sheet and MIL-PRF-1.

DESCRIPTION: Gas filled, glow discharge (neon), cold cathode

PIN CONNECTIONS AND DIMENSIONS: See figure 1

ABSOLUTE-MAXIMUM RATINGS:

Parameter:	Ebb	Ik (individual)	Rp	TA	Alt
Unit:	Vdc	mA	Ohms	°C	ft
Maximum:	---	3.5	---	+55	70,000
Minimum:	170	---	---	-20	---
TEST CONDITIONS	170	---	8.2K ± 1%	---	---

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GENERAL:

Qualification – Not required

This specification sheet uses accept on zero defect sampling in accordance with MIL-PRF-1, table III.

TABLE I. Testing and inspection.

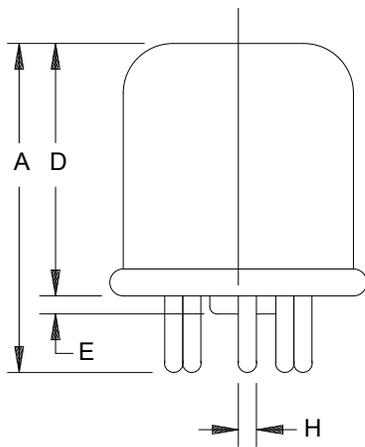
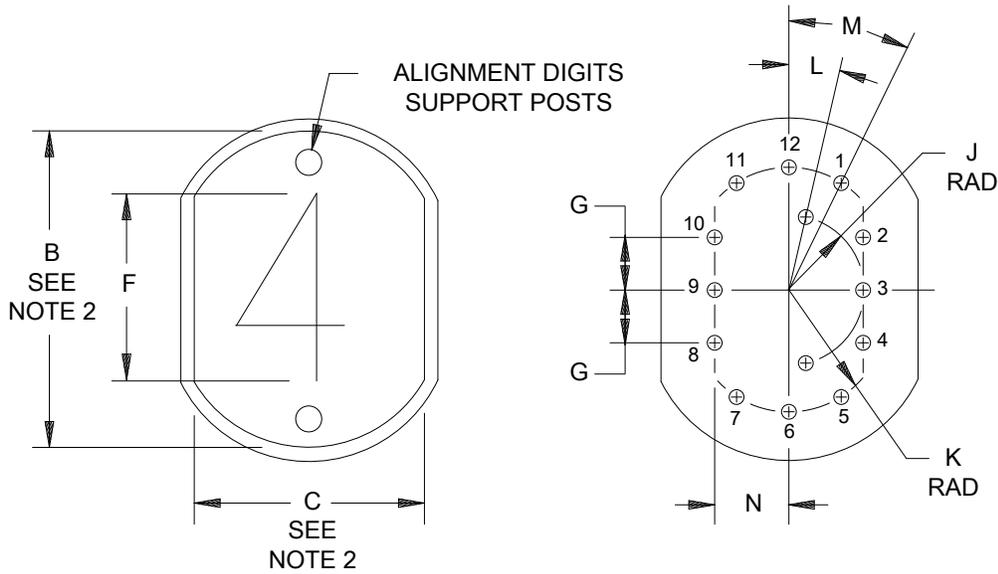
Requirement or test	MIL-STD-1311 Method	Notes	Conditions	Symbol	Limits		Unit
					Min	Max	
<u>Conformance inspection, part 1</u>							
Ionization voltage (1) (with illumination)	3347		Ambient illumination = 5 to 50 foot candles	Ebb	---	170	Vdc
Uniformity of cathode glow	3333	<u>1/</u>	Ambient illumination = 5 to 50 foot candles	---	---	---	---
Electrode current (cathode)	1256	<u>1/</u>	Individual cathodes	Ik	1.5	3.0	mA
<u>Conformance inspection, part 2</u>							
Variable-frequency vibration	1031	<u>2/ 3/</u>		---	---	---	---
Light output	---	<u>4/</u>	Light individual cathodes	---	0.5	---	ftC
Alignments, digits	---	<u>5/</u>		---	---	±3	degrees
Shock	---	<u>2/ 6/</u>	250 G; duration 1.5 ± 1.0 ms	---	---	---	---
<u>Conformance inspection, part 3</u>							
Life-test provisions (1)	---	<u>7/</u>	sequential counting: 1 Hz; t = 1,000 hours minimum	---	---	---	---
Life-test end points (1)	---	<u>1/</u>	Uniformity of cathode glow Cathode current Light output	Ik --- ---	1.3 0.5 ---	3.5 ---	mA ftC
Life-test provisions (2)	---	<u>8/ 9/</u>	One numeral glowing steadily; t = 1,000 hours minimum	---	---	---	---
Life-test end points (2)	---	<u>1/</u>	For numeral under test: Uniformity of cathode glow Cathode current Light output	Ik --- ---	1.3 0.5 ---	3.5 ---	mA ftC

## NOTES:

- 1/ No glow shall be permitted on any part other than the numeral under test.
- 2/ No permanent shorts or opens shall be permitted.
- 3/ On each plane the 10 cathodes shall be sequentially energized at the test conditions.
- 4/ Light output of each numeral is measured with a foot-candle (ftC) meter and an eye-corrected photonic cell. The entire cell area is illuminated and is coupled to the tube by a light-tight cylinder so that the face of the cell is 1.5 inches from the tube base.
- 5/ Centerline of numerals, drawn through the top of the numeral support posts, shall be within the tolerance specified hereon in relation to the line drawn on the base of the tube through pins 6 and 12.

TABLE I. Testing and inspection - continued

- 6/ Shock test shall be made on any shock machine capable of producing a half-sine-wave-shock waveform of the specified duration and amplitude. No voltages shall be applied during this test. Each tube shall be subjected to a total of 20 shocks (i.e. five shocks in each of positions X, Y, Z plus, and Z minus in any sequence). This is a destructive test. Tubes that have undergone destructive tests shall not be delivered on the contract or order.
- 7/ Tubes shall be energized with a duty cycle greater than 90 percent.
- 8/ The life-test sample from the first lot each month shall continue on life test for an additional 1,000 hours (2,000 hours total life-test time). 2,000 hours' end point shall be the same as the 1,000-hour end points, life test (2). Failure of this 2,000-hour life test shall result in the following action. Acceptance of subsequent lots shall be dependent on each lot passing the 2,000-hour life test until such time as three consecutive lots pass the 2,000-hour life test. At this time acceptance will revert to the 1,000-hour life test with only the first lot of each month continuing to 2,000 hours as before.
- 9/ One tube shall have the top numeral cathode glowing steadily. One tube shall have the bottom numeral cathode glowing steadily. One tube shall have the "0" numeral cathode glowing steadily.



1234567890

NUMERAL DESIGN

Pin Connections	
Pin	Element
1	anode
2	k0
3	k9
4	k8
5	k7
6	k6
7	k5
8	k4
9	k3
10	k2
11	k1
12	int. con.
13	int. con.
14	int. con.

Ltr	Minimum		Maximum	
	in.	mm	in.	mm
Quality conformance inspection, part 2				
A			1.120	28.45
B			1.020	25.91
C			.790	20.07
D			.862	21.89
E			.064	1.63
F	.595	15.11	.625	15.87
Reference dimensions (see note 1)				
G	.170	4.32	applies to pin pairs: 2&3, 3&4, 8&9, 9&10	
H	.040	1.02	pin diameter	
J	.210	5.33	applies to pins: 13 and 14	
K	.340	8.64	applies to pins: 11, 12, 1, 5, 6, 7	
L	13°			
M	26°			
N	.220	5.59	applies to pins: 2, 3, 4, 8, 9, 10	

NOTES:

1. Reference dimensions are for information only.
2. Applies to entire length of bulb.

FIGURE 1. Outline drawing of electron tube type 8422.

Referenced documents. In addition to MIL-PRF-1, this document references the following: MIL-STD-1311.

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Custodians:  
Army - CR  
Navy - EC  
Air Force - 85  
DLA - CC

Preparing activity:  
DLA - CC  
(Project 5960-2013-034)

Review activities:  
Army - AR, MI  
Navy - AS, CG, MC, OS  
Air Force - 19, 99

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