

INCH-POUND

MIL-PRF-1/1232E  
13 January 2012  
SUPERSEDING  
MIL-E-1/1232D  
2 July 1999

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, GAS SWITCHING  
TYPE 7166

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 document and the latest issue of MIL-PRF-1.

DESCRIPTION: TR, frequency range 1,220 to 1,365 MHz, nominal peak power rating 1.5 Mw.

ABSOLUTE RATINGS:

Parameter:	Incident power	Du	Ebb	li	Alt
Unit:	Mw	---	V dc	μA dc	ft
Maximum:	2.0	0.001	---	200	10,000
Minimum:	---	---	-750	100	---

PHYSICAL CHARACTERISTICS:

Dimensions: See figure 1.  
 Mounting: See figure 2. 1/  
 Weight: 9 pounds (approximate).

TEST CONDITIONS:

Parameter:	Incident power	tp1	tp2	prp	li	F
Unit:	Mw	μs	μs	pps	μA dc	MHz
Tolerance:	± 5%	± 0.15	± 0.15	---	---	---
Test condition 1:	0.50	4.0	1.0	250	100	F3
Test condition 2:	2.00	4.0	---	250	100	F3

Frequency		
F	MHz	±
1	1,220	1%
2	1,255	1%
3	1,292	1%
4	1,325	1%
5	1,365	1%

See footnotes at end of table I.

GENERAL:

Qualification: Not required

Preproduction sample approval: Required. 2/

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

## MIL-PRF-1/1232E

TABLE I. Testing and inspection.

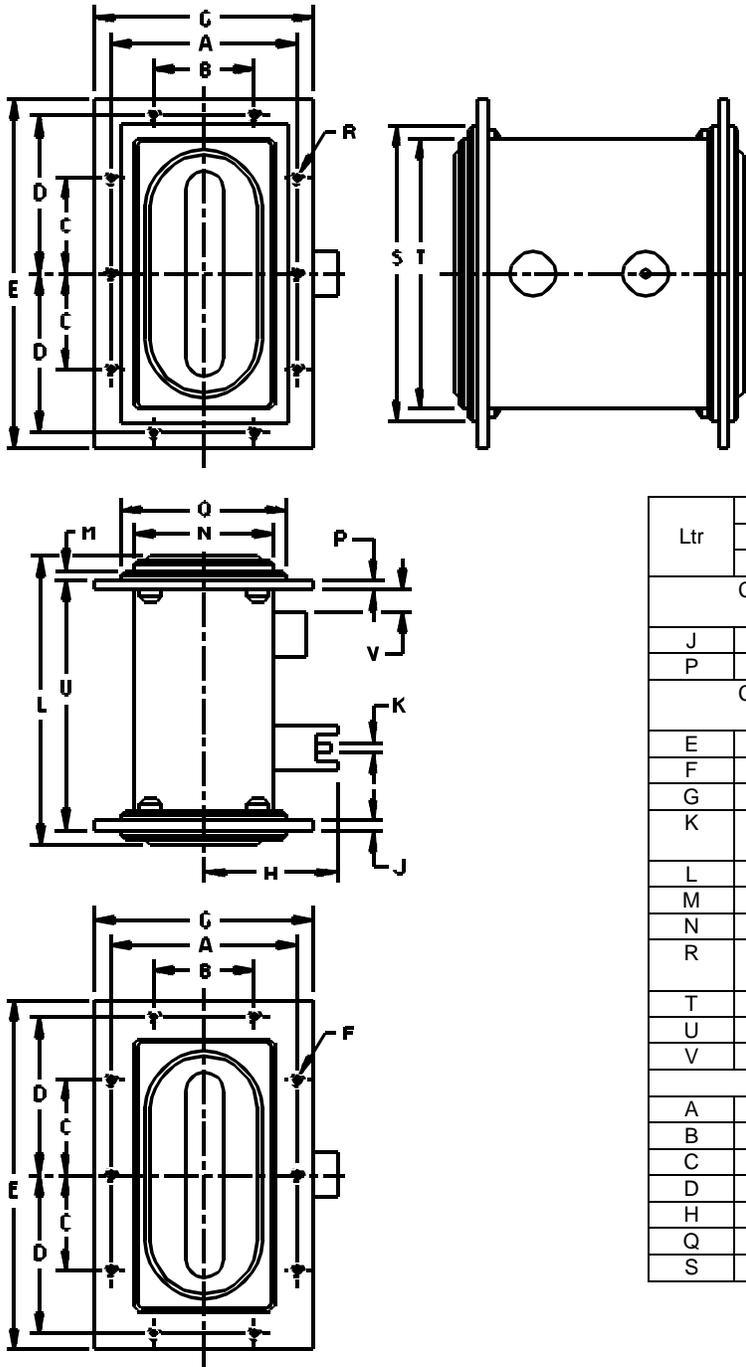
Inspection	Method MIL-STD-1311	Notes	Test	Conditions	Symbol	Limits		Unit
						Min	Max	
<u>Preproduction sample approval inspection</u>								
Humidity	1011	---	---		---	---	---	---
Degradation due to vibration	4021	---	---	t = 1 hour	---	---	---	---
Mechanical insertion	---	<u>1/ 3/</u>	---		---	---	---	---
<u>Conformance inspection, part 1</u>								
Ignitor voltage drop	4406	---	---	li = 100 $\mu$ A dc	Eid	275	475	V dc
Spike-leakage energy	4452	---	1		Ws	---	0.25	erg
Flat-leakage power	4452	---	1		pf	---	75	mw
Temperature cycling (nonoperating)	1027	---	---		---	---	---	---
Ignitor ignition time	4401	---	---	Ebb = -750 V dc; Ri = 4.5 Meg	t	---	5.0	sec
Low-level VSWR	4473	<u>4/</u>	---	F = (F1, F2, F3, F4, and F5) $\pm$ 0.1%	$\sigma$	---	1.3	---
Arc loss	4488	---	1		La	---	0.3	dB
<u>Conformance inspection, part 2</u>								
Dielectric material strain	4101	---	---		---	---	---	---
Insertion loss	4416	---	---	F = F3 $\pm$ 5%	Li	---	0.5	dB
Ignitor interaction	4421	---	---	$\Delta$ li = 100 $\mu$ A dc	$\Delta$ Li	---	0.2	dB
Ignitor noise ratio	4460	---	---	Fo = 1,300 MHz; li = 100 $\mu$ A dc	Nr	---	1.3	---
Recovery time	4471	---	2		t	---	20	$\mu$ s

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method MIL-STD-1311	Notes	Test	Conditions	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 3</u>								
Life test	---	<u>5/ 6/</u>	2	Group D; F = F3 ± 3%; R = 2.5 Meg	t	1,000	---	hours
Life-test end points:	---							
Spike-leakage energy	4452	---	1		Ws	---	0.50	erg
Ignitor noise ratio	4460	---	---	li = 100 µA dc	Nr	---	1.5	---
Recovery time	4471	---	2		t	---	25	µs
Ignitor voltage drop	4406	---	---	li = 100 µA dc	Eid	---	550	V dc
Insertion loss	4416	---	---		Li	---	0.7	dB
Arc loss	4488	---	1		La	---	0.3	dB
Temperature cycling life test	1027	---	---	10 cycles	---	---	---	---

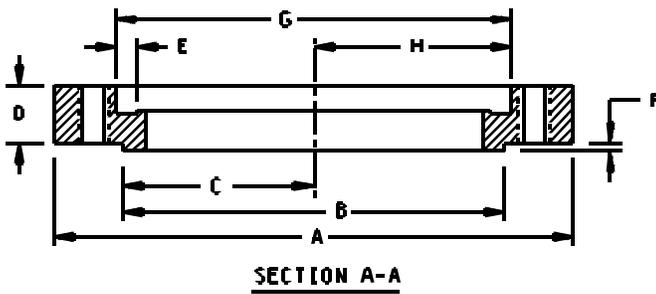
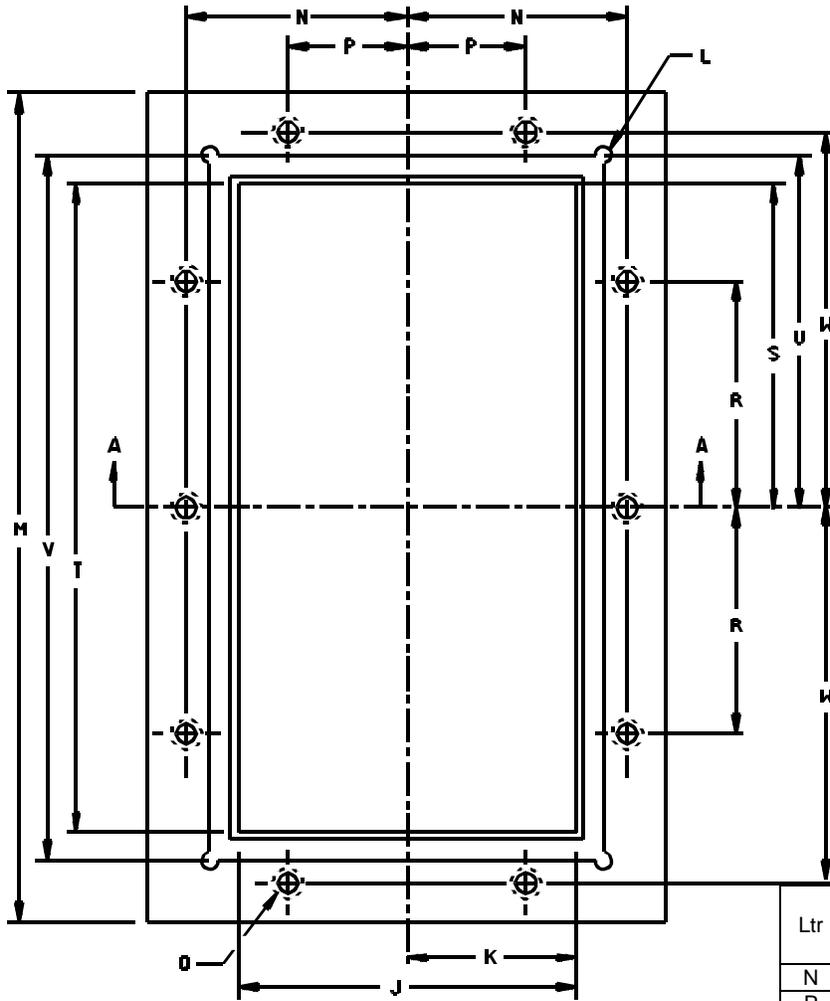
- 1/ A suitable gasket shall be bolted between the tube and the mounting seat. Tubes shall be supplied with gaskets at both ends.
- 2/ Preproduction sample approval requirements hereby replace any qualification requirements referable to the product covered herein. The term "First article testing" shall be considered as synonymous with the term "Preproduction sample approval testing." All tests applicable herein (including all preproduction sample approval and conformance inspection, parts 1, 2, and 3) shall be performed during preproduction sample inspection. A failure of any one tube in any of the tests shall be cause for decision of preproduction sample disapproval.
- 3/ The tube shall be capable of being inserted and removed from its seat a minimum of 15 times with no deterioration in the tube's electrical characteristics.
- 4/ A swept frequency method may be used for this test.
- 5/ The TR tube will be terminated with a waveguide to type N transition (VSWR not to exceed 1.1:1 at test frequency) and a coaxial type N crystal mount connected to the transition. The mount will contain a type 1N21WE crystal which will be terminated by a dc ground return of  $100 \pm 10$  ohms. The crystal mount will have a VSWR not to exceed 1.5 when tested with a microwave source at the test frequency which provides a crystal dc current between 0.3 ma to 1.5 ma in a 100 ohms termination. At the beginning of life test, the crystal noise figure (NF receiver) shall not exceed 7.0 dB under the standard 1N21WE test conditions. The actual crystal noise figure at the beginning of life shall be recorded.
- 6/ The crystal noise figure degradation from the initial value shall not exceed 1.5 dB maximum. One crystal failure will be allowed during the life test. If a crystal failure occurs, a new crystal shall be inserted in the mount and the life test shall continue for a minimum of 100 hours.



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
Conformance inspection, part 1 <u>2/</u>				
J	.240	.260	6.10	6.60
P	.240	.260	6.10	6.60
Conformance inspection, part 1 <u>4/</u>				
E	See note			
F	5/16-18UNC-2A (10) holes			
G	See note			
K	.245 DIA	.255 DIA	6.22 DIA	6.48 DIA
L	---	7.250	---	184.15
M	.240	.260	6.10	6.60
N	---	3.475	---	88.27
R	Dr. size S-.348 (10) holes		Dr. size S- 8.84 (10) holes	
T	---	6.725	---	170.82
U	6.150	6.250	156.21	158.75
V	.562	---	14.27	---
Conformance inspection, part 2				
A	4.618	4.634	117.30	117.70
B	2.492	2.508	63.30	63.70
C	2.367	2.383	60.12	60.53
D	3.930	3.946	99.82	100.23
H	---	3.3125	---	84.14
Q	4.105	4.125	104.27	104.78
S	7.355	7.375	186.82	187.33

NOTE: This dimension shall conform to the requirements of MIL-PRF-3922/52A-001.

FIGURE 1. Outline drawing of electron tube type 7166.



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
N	2.309	2.317	58.65	58.85
P	1.246	1.254	31.65	31.85
R	2.371	2.379	60.22	60.43
W	3.934	3.942	99.92	100.13
Nominal				
A	5.437		138.10	
B	4.000		101.60	
C	2.000		50.80	
D	.600		15.24	
E	.2188 TYP		5.56 TYP	
F	.080		2.03	
G	4.135		105.03	
H	2.067		52.50	
J	3.537		89.84	
K	1.768		44.91	
L	.2188 RAD x .270 DEEP TYP		5.56 RAD x 6.86 DEEP TYP	
M	8.6875		220.66	
Q	5/16-18UNC-2B (10) holes			
S	3.393		86.18	
T	6.787		172.39	
U	3.692		93.78	
V	7.385		187.58	

FIGURE 2. Mounting seat.

Referenced documents. In addition to MIL-PRF-1, this specification sheet references MIL-STD-1311.

The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

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

Preparing activity:

DLA - CC

(Project 5960-2011-016)

Review activities:

Army - AR, MI  
Navy AS, CG, MC, OS, SH  
Air Force - 19, 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.daps.dla.mil/>.