

INCH-POUND

MIL-PRF-1/1725A
26 January 1998
SUPERSEDING
MIL-E-1/1725
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PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, POWER

TYPE 8169

The requirements for acquiring the electron tube described herein shall consist of this document and the latest issue of MIL-PRF-1.

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

DESCRIPTION: Tetrode.
See figure 1.
Mounting position: Vertical, base down or up.
Weight: 5.5 pounds nominal.

ABSOLUTE RATINGS: F1 = 150 MHz.

Parameter:	Ef	Eb	Ec2	Ec1	Ib	Pg 1	Pg 2	Pp	T (anode core & seal) °C	cooling
Unit:	V ac	kV dc	V dc	V dc	A dc	W	W	kW		<u>2/</u>
Maximum:										
Class C Teleg:	9.0 ± 5%	7.0	1000	-500	2.0	50	175	3.0	250	----
Class C Teleg: (anode mod)	9.0 ± 5%	5.0	600	-500	1.4	50	175	2.0	250	----
Class AB1:	9.0 ± 5%	7.0	1000	----	2.0	50	175	3.5 <u>3/</u>	250	----
Test condition:	9.0	2.0	750	Adj	1.0	----	----	----	----	<u>4/</u>

See footnotes at end of table I.

GENERAL:

Qualification: Required.

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TABLE I. Testing and inspection.

Inspection	Method	Conditions	Acceptance level	Inspection level or code	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 1</u>								
Peak emission	1231	eb = ec2 = ec1 = 2.5 kv	0.65	II	is	40	---	a
Filament current	1301		0.65	II	lf	39.5	43.5	A ac
Electrode voltage (grid)	1261		0.65	II	Ec1	-95	-127	V dc
Total grid current	1266		0.65	II	lc1	---	-20	μA dc
Electrode current (screen)	1256		0.65	II	lc2	0	+25	mA dc
Primary-grid emission (control)	1266	Ef = 10 V; lc1 = 400 mA dc; t= 15; anode and g2 grounded	0.65	II	lsg1	---	-50	μA dc
Primary-grid emission (screen)	1266	Ef = 10 V; lc2 = 400 mA dc; t= 15; Ec1 = 0; anode grounded	0.65	II	lsg2	---	-100	μA dc
<u>Conformance inspection, part 2</u>								
Current division (method B, short pulse)	1372	Eb = Ec2 = 850 V dc; Ec1 = -300 V dc; egk/ib = 5.5 a	---	---	egk ic2	---	0 0.95	v a
Electrode voltage (grid)	1261	Eb = 4.0 kv dc; Ec2 = 850 V dc; Ec1/lb = 1.0 mA dc	---	---	Eco	---	-310	V dc
Direct-interelectrode capacitance	1331	Grounded cathode	---	---	Cin Cout Cgp	120 10.5 ---	140 14.5 1.40	pF pF pF
Direct-interelectrode capacitance	1331	Grounded grid	---	---	Cin Cout Cpk	55.0 10.5 ---	67.0 14.5 0.20	pF pF pF
Linear amplifier power output and distortion, two-tone method	2204	Class AB1 amplifier; F = 2 to 30 MHz; Eb = 5.0 kv dc; Ec2 = 850 V dc; Ec1/lbo = 500 mA dc; Eg1/Po = 5.0 kW (useful); Rl = 1700 ± 100 ohms; anode loaded Q = 15 ± 2; Rg = 1000 ohms (max)	---	---	3rd IM 5th IM	-32 -37	---	dB dB

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Conditions	Acceptance level	Inspection level or code	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 3</u>								
Service-life guarantee	---	1/	---	---	---	---	---	---
<u>Periodic-check tests</u>								
Shock, specified pulse	1042	No voltage applied; accel = 15 G peak (min); shock = 11 ms half-sine; total impact = 6 (3 each X and Z axes)	---	---	---	---	---	---
Shock, specified pulse end points:								
Electrode voltage (grid)	1261		---	---	Ec1	-95	-127	V dc
Total grid current	1266		---	---	lc1	---	-25	μA dc
Vibration, mechanical	1032	No voltage applied; accel = 2 G peak (min); F = 10 to 50 Hz, ascending only; sweep t = 3 to 8 minutes; 1 sweep each X and Z axes	---	---	---	---	---	---
Vibration mechanical end points:								
Electrode voltage (grid)	1261		---	---	Ec1	-95	-127	V dc
Total grid current	1266		---	---	lc1	---	-25	μA dc

- 1/ The tube manufacturer warrants the tube for one year from the date of shipment, or 1,000 hours of filament life, whichever first elapses. This warranty applies only when the tube is operated within the maximum ratings (see "Absolute ratings" of MIL-PRF-1). A defective tube shall either be replaced, or at the option of the manufacturer a credit shall be made in the amount of the original purchase price prorated on the basis of 1,000 hours of "filament-on" time.
- 2/ Minimum airflow requirements for incoming air at 40° C maximum at sea level, for operation below 30 MHz, are shown in table II. Additional cooling may be required for operation above 30 MHz. In all applications, an air-system socket, such as the EIMAC SK-1400 with air chimney such as the EIMAC SK-1406, or equivalents, should be used. Air should be directed in a base-to-anode direction, and the values shown are for the tube and the SK-1400/SK-1406 combination with the air so directed. In all cases, enough air should be used to prevent operation with the anode core and/or seal temperatures above the maximum rating, and where long life and consistent performance are factors, cooling in excess of minimum requirements is normally beneficial. Air should be applied before or simultaneously with the application of filament voltage, and may be removed simultaneously with the electrode voltages.

TABLE II. Minimum airflow requirements.

Anode dissipation (watts)	Airflow (cfm)	Approximate pressure drop (in. H ₂ O)
1500	36.5	0.3
2500	60	0.8
3500	86	1.6

- 3/ During continuous Class AB1 operation, it is not likely that the absolute maximum ratings for the anode voltage (Eb) and anode current (Ib) can be used simultaneously, as efficiency would have to be very high (75 percent) in order to avoid exceeding the anode dissipation (Pp) rating of 3.5 kW.
- 4/ In all electrical tests involving application of filament voltage, an air-system socket and chimney may be used and forced-air cooling is permissible.

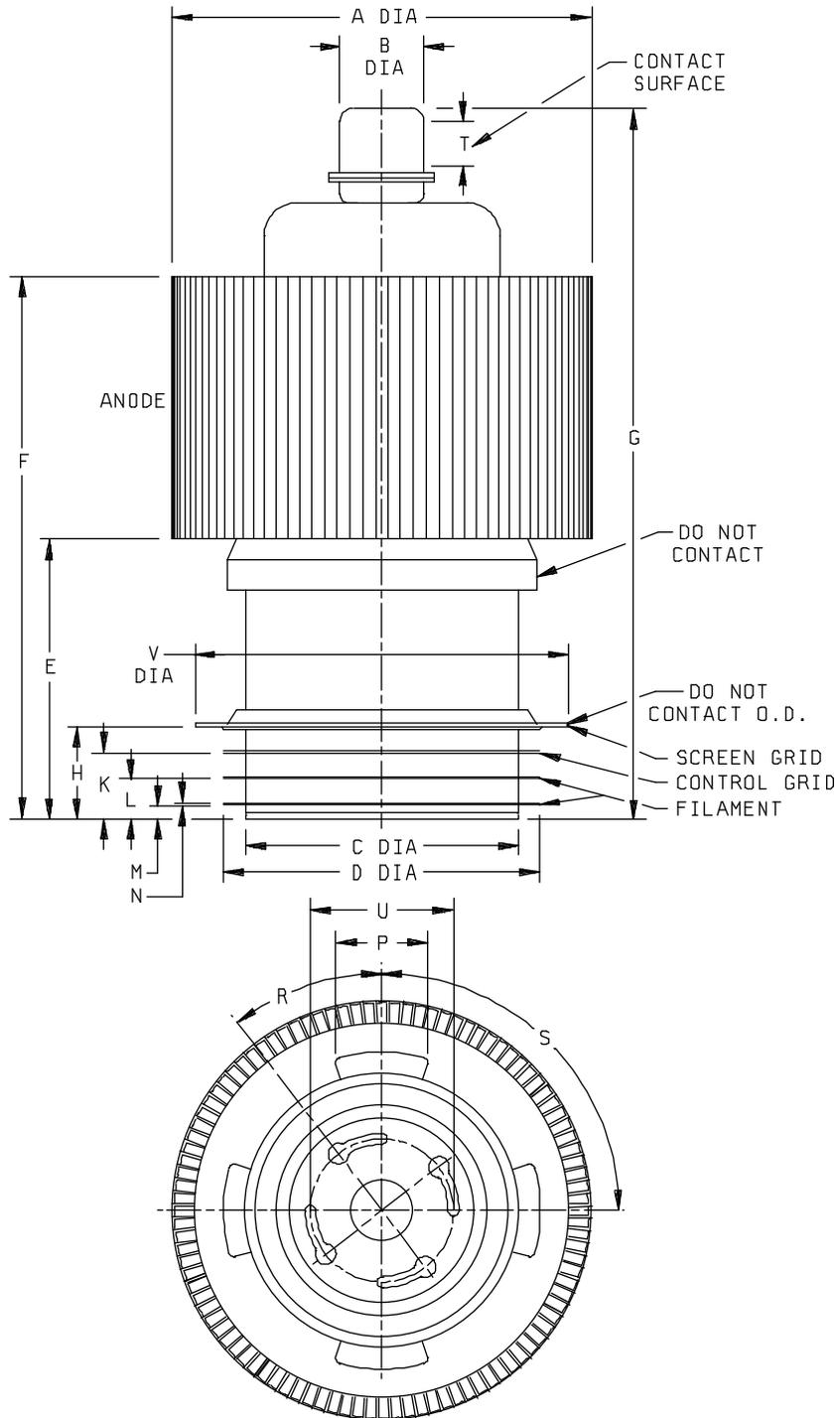


FIGURE 1. Outline drawing of electron tube type 8169.

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LTR	Dimensions			
	Millimeters		Inches	
Conformance inspection, part 2				
	Min	Max	Min	Max
A	115.82	117.48	4.560	4.625
D	88.65	90.17	3.490	3.550
E	73.03	79.38	2.875	3.125
H	24.51	25.53	0.965	1.005
K	17.78	18.54	0.700	0.730
L	10.92	11.68	0.430	0.460
M	4.06	4.57	0.160	0.180
N	0.46	0.64	0.018	0.025
P	26.67	29.21	1.050	1.150
R	----	----	39°	41°
S	----	----	89°	91°
U	39.55	39.80	1.557	1.567
Conformance inspection, part 3 (periodic check)				
B	21.84	22.61	0.860	0.890
C	----	77.47	----	3.050
F	149.23	155.58	5.875	6.125
G	193.04	200.66	7.600	7.900
T	12.32	----	0.485	----
V	101.60	106.05	4.000	4.175

FIGURE 1. Outline drawing of electron tube type 8169 - Continued.

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Custodians:

Army - CR
Air Force - 80

Review activities:

Army - AR
Air Force - 11, 17, 99

Preparing activity:
DLA - CC

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