

INCH-POUND

MIL-PRF-1/1725C
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SUPERSEDING
MIL-PRF-1/1725B
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PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, POWER

TYPE 8169

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: 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 and seal)	Cooling
Unit:	V ac	kV dc	V dc	V dc	A dc	W	W	kW	°C	<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.

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

MIL-PRF-1/1725C

TABLE I. Testing and inspection.

Inspection	MIL-STD-1311 Method	Conditions	Symbol	Limits		Unit
				Min	Max	
<u>Conformance inspection, part 1</u>						
Peak emission	1231	$e_b = e_{c2} = e_{c1} = 2.5 \text{ kv}$	is	40	----	a
Filament current	1301		If	39.5	43.5	A ac
Electrode voltage (grid)	1261		Ec1	-95	-127	V dc
Total grid current	1266		Ic1	----	-20	μA dc
Electrode current (screen)	1256		Ic2	0	+25	mA dc
Primary-grid emission (control)	1266	$E_f = 10 \text{ V}$; $I_{c1} = 400 \text{ mA}$ dc; $t = 15$; anode and g2 grounded	Isg1	----	-50	μA dc
Primary-grid emission (screen)	1266	$E_f = 10 \text{ V}$; $I_{c2} = 400 \text{ mA}$ dc; $t = 15$; $E_{c1} = 0$; anode grounded	Isg2	----	-100	μA dc
<u>Conformance inspection, part 2</u>						
Current division (method B, short pulse)	1372	$E_b = E_{c2} = 850 \text{ V}$ dc; $E_{c1} = -300 \text{ V}$ dc; $e_{gk}/i_b = 5.5 \text{ a}$	$\left. \begin{matrix} e_{gk} \\ i_{c2} \end{matrix} \right\}$	----	0	v
				----	0.95	a
Electrode voltage (grid)	1261	$E_b = 4.0 \text{ kV}$ dc; $E_{c2} = 850 \text{ V}$ dc $E_{c1}/I_b = 1.0 \text{ mA}$ dc	Eco	----	-310	V dc
Direct-interelectrode capacitance	1331	Grounded cathode	$\left. \begin{matrix} C_{in} \\ C_{out} \\ C_{gp} \end{matrix} \right\}$	120	140	pF
				10.5	14.5	pF
				----	1.40	pF
Direct-interelectrode capacitance	1331	Grounded grid	$\left. \begin{matrix} C_{in} \\ C_{out} \\ C_{pk} \end{matrix} \right\}$	55.0	67.0	pF
				10.5	14.5	pF
				----	0.20	pF
Linear amplifier power output and distortion, two-tone method	2204	Class AB1 amplifier; $F = 2$ to 30 MHz ; $E_b = 5.0 \text{ kV}$ dc; $E_{c2} = 850 \text{ V}$ dc; $E_{c1}/I_{b0} = 500 \text{ mA}$ dc; $E_{g1}/P_o = 5.0 \text{ kW}$ (useful); $R_l = 1700 \pm 100 \text{ ohms}$; anode loaded $Q = 15 \pm 2$; $R_g = 1000 \text{ ohms}$ (max)	3rd IM 5th IM	-32 -37	----	dB dB

See footnotes at end of table.

MIL-PRF-1/1725C

TABLE I. Testing and inspection - Continued.

Inspection	MIL-STD-1311 Method	Conditions	Symbol	Limits		Unit
				Min	Max	
<u>Conformance inspection, part 3</u>						
Service-life guarantee	----	<u>1</u> /	----	----	----	----
<u>Periodic-check tests</u>						
Shock, specified pulse	1042	No voltage applied; acceleration = 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		----	----	----	----
Vibration mechanical end points:						
Electrode voltage (grid)	1261	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	Ec1	-95	-127	V dc
Total grid current	1266		lc1	----	-25	μA dc

| See footnotes at end of table.

MIL-PRF-1/1725C

TABLE I. Testing and inspection - Continued.

NOTES:

- 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 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)
1,500	36.5	0.3
2,500	60	0.8
3,500	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.

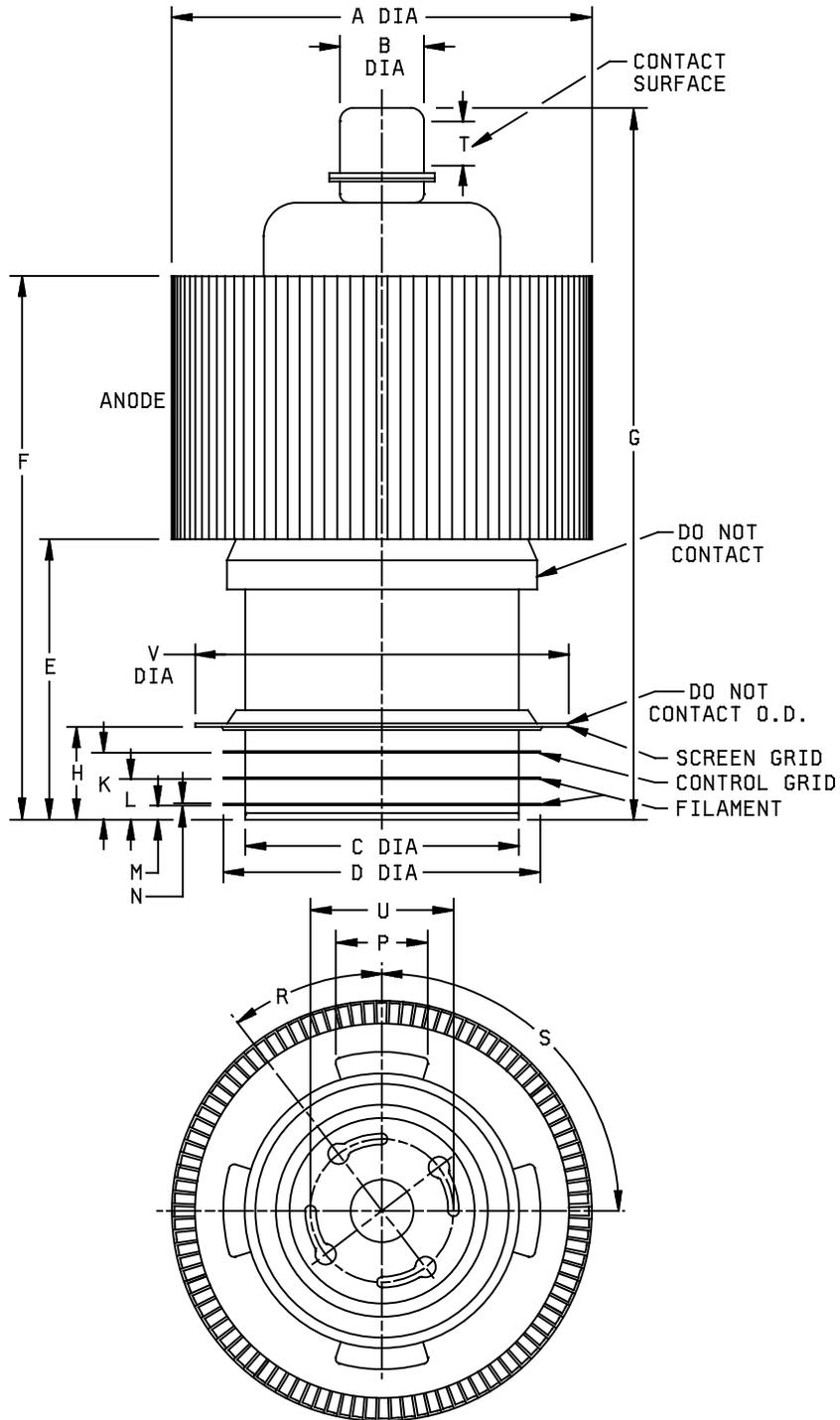


FIGURE 1. Outline drawing of electron tube type 8169.

MIL-PRF-1/1725C

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.

MIL-PRF-1/1725C

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
Air Force - 85
DLA - CC

Preparing activity:

DLA - CC

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Review activities:

Army – AR, AV, MI
Air Force - 99

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