

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, POWER

TYPE 8170W

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, ceramic-metal.
 See figure 1.
 Mounting position: Vertically, base up or down.
 Weight: 9.5 pounds (4.31 kg) nominal.

ABSOLUTE RATINGS: F = 100 MHz

Parameter:	Ef	Eb	Ec2	Ec1	Ib	Pg1
Unit:	V ac	kV dc	kV dc	V dc	A dc	W
Maximum:						
Class C Teleg:	7.5 ±5%	7.5	1.5	-500	3.0	75
Class C Teleg: (Anode mod)	7.5 ±5%	5.0	1.0	-500	2.5	75
Class AB:	7.5 ±5%	7.5	1.5	---	4.0	75
Test conditions:	7.5	2.0	0.75	Adj	1.0	---

ABSOLUTE RATINGS: F = 100 MHz

Parameter:	Pg2	Pp	T (Anode core and seal)	Cooling
Unit:	W	kW	°C	1/
Maximum:				
Class C Teleg:	250	5.0	250	---
Class C Teleg: (Anode mod)	250	3.5 2/	250	---
Class AB:	250	6.0	250	---
Test conditions:	---	---	---	3/

See footnotes at end of table I.

GENERAL:

Qualification: Required.

MIL-PRF-1/1427G

TABLE I. Testing and inspection.

Inspection	Method MIL-STD- 1311	Notes	Conditions	Acceptance Level <u>11/</u>	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 1</u>								
Filament current	1301	---		0.65	If	73	78	A ac
Electrode voltage (grid)	1261	---		0.65	Ec1	-95	-127	V dc
Total grid current	1266	<u>10/</u>		0.65	Ic1	---	-20	μA dc
Electrode current (screen)	1256	---		0.65	Ic2	---	+15	mA dc
Primary grid emission (control)	1266	---	Ic1 = 825 mA dc; t = 15; Ef = 8.25 V ac; anode and screen-grid floating	0.65	Isg1	---	-35	μA dc
Primary grid emission (screen)	1266	---	Ec1 = 0; t = 15; Ic2 = 625 mA dc; Ef = 8.25 V ac; anode floating	0.65	Isg2	---	-100	μA dc
Peak emission	1231	---	eb = ec1 = ec2 = 2.5 kv	0.65	is	53	---	a
<u>Conformance inspection, part 2</u>								
Direct-interelectrode capacitance (grounded cathode)	1331	<u>7/</u>		---	{ Cin Cout Cgp	{ 108.0 18.0 ---	{ 122.0 23.0 1.0	{ pF pF pF
Direct-interelectrode capacitance (grounded grid)	1331	---		---	{ Cin Cout Cpk	{ 48.0 19.0 ---	{ 58.0 24.0 .16	{ pF pF pF
Current division (method B, short pulse)	1372	---	Eb = Ec2 = 1,500 V dc; Ec1 = -600 V dc; egk/ib = 11a; tp = 2 μs (min); prr = 30 (min)	---	{ egk ic2	{ --- ---	{ 0 1.25	{ v a
RF useful output power	2214	<u>3/ 8/</u>	F = 2 to 30 MHz; Eb = 6.0 to 6.6 kV dc; Ib = 2.0 A dc (max) <u>Air:</u> SK-300: 165 cfm(max) SK-300A: 190 cfm(max)	---	{ Ic1 Ic2 Po	{ --- --- 7.0	{ 80 375 ---	{ mA dc mA dc kW (useful)

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method MIL-STD- 1311	Notes	Conditions	Acceptance Level 11/	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 3</u>								
Service-life guarantee	---	9/		---	---	---	---	---
Vibration, mechanical	1032	4/ 5/	Accel = 5 G peak (min); 14 to 200 Hz; accel = 2 G peak (min); 200 to 500 Hz; F = 14 to 500 to 14 Hz; no voltages applied	---	---	---	---	---
Vibration, mechanical end-points:	---							
Filament current	1301	4/ 6/		---	ΔI_f	---	1.5	A ac
Electrode voltage (grid)	1261	---		---	E_{c1}	-95	-127	V dc
Total grid current	1266	---		---	I_{c1}	---	-25	μA dc
Shock, specified pulse	1042	4/	Condition A	---	---	---	---	---
Shock, specified pulse end points:	---							
Filament current	1301	4/ 6/		---	ΔI_f	---	1.5	A ac
Electrode voltage (grid)	1261	---		---	E_{c1}	-95	-127	V dc
Total grid current	1266	---		---	I_{c1}	---	-25	μA dc

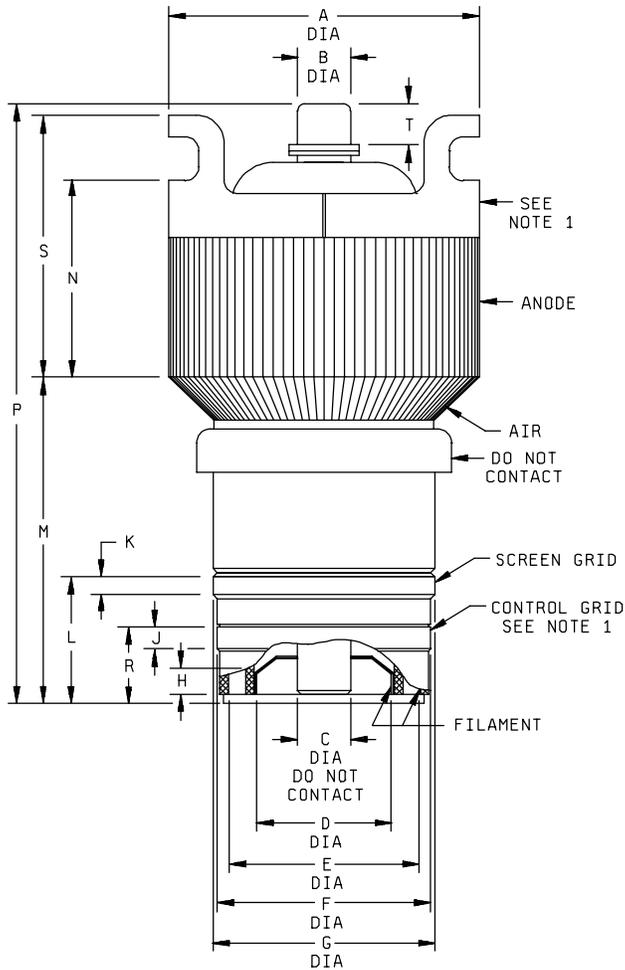
- 1/ Minimum airflow requirements for incoming air at 50°C maximum at sea level are shown in table IA. In all cases of operation, a socket which provides forced-air cooling of the base shall be used (such as EIMAC SK-300 with SK-306 chimney or equivalents, or SK-300A chimney, or equivalents) and maximum anode core and seal temperature ratings shall not be exceeded. The static pressure drop values shown in table IA are for the tube and socket, with an SK-306 chimney, or equivalent installed. This pressure drop varies with the amount of escaping air and with the shape and construction of the air director (chimney). Ratings apply for bias voltage less than 500 volts and frequencies less than 100 MHz. Air cooling of the tube shall be increased with increasing negative bias or with increasing frequency. The airflow shall be applied before or simultaneously with electrode voltages, and shall be maintained for a minimum of 2 minutes after all voltages are removed.

TABLE IA. Minimum airflow requirements.

Anode dissipation (watts)	SK-300 1/		SK-300A 1/	
	Airflow (cfm)	Approximate pressure drop (In. H ₂ O)	Airflow (cfm)	Approximate pressure drop (In. H ₂ O)
2,000	75	0.4	75	0.4
3,000	100	0.7	105	0.7
4,000	135	1.2	145	1.1
5,000	165	1.8	190	1.5
6,000	200	2.5	230	2.0

TABLE I. Testing and inspection - Continued.

- 2/ Applies to carrier only conditions.
- 3/ In all electrical tests involving application of filament voltage, the use of an EIMAC air-system socket, type SK-300 or SK-300A, or equivalent, and air chimney SK-306, or equivalents, will be permissible. Unless otherwise specified under the listed test conditions, forced-air cooling (in a base-to-anode direction) is permitted at a rate of 50 cfm (maximum at sea level, with air at 20°C) for the base and anode; a separate source may be used for the base and anode but neither shall exceed 50 cfm.
- 4/ This test shall be performed yearly. An accept on zero defect sampling plan shall be used, with sample of three tubes with an acceptance number of zero. In the event of failure, the test will be made as a part of conformance inspection, part 2, acceptance level 6.5 (see 11/). The yearly sampling plan may be reinstated after three consecutive samples have been accepted.
- 5/ Each tube under test shall be subjected to one sweep cycle in each of the three axes X, Y, and Z. One sweep cycle (14 to 500 and back to 14 Hz) shall be covered in 6 to 12 minutes.
- 6/ Any change in filament current resulting from the vibration or shock testing (considered individually) shall not exceed the specified limit for ΔI_f .
- 7/ It shall be allowable to measure Cg1g2 and Cg1k separately, with all unused elements grounded in each case, and consider the sum to be equal to C_{in}.
- 8/ If an oscillator circuit is used, the screen voltage shall be set to $E_{c2} = 670$ V dc, and a grid-leak resistance (Rg1) in the control-grid circuit is permissible, with the value of Rg1 adjusted to produce the specified average anode current. If an amplifier circuit is used, protective bias or a grid-leak resistance may be used, with a fixed screen-grid voltage of $E_{c2} = 500$ V dc, and driving power adjusted to produce the specified average anode current.
- 9/ The tube manufacturer warrants the tube for 1 year from 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 pro-rated on the basis of 1,000 hours of "filament-on" time.
- 10/ This test shall be the first test performed after the holding period.
- 11/ This specification sheet uses accept on zero sampling in accordance with MIL-PRF-1, table III.



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
Conformance inspection, part 2				
C	.600	.760	15.24	19.30
D	1.896	1.936	48.16	49.17
E	3.133	3.173	79.58	80.59
F	3.792	3.832	96.32	97.33
G	3.980	4.020	101.09	102.11
H	.188	---	4.78	---
J	.188	---	4.78	---
K	.188	---	4.78	---
L	1.764	1.826	44.81	46.38
P	8.625	9.125	219.08	231.78
R	.986	1.050	25.04	26.67
T	.375	---	9.53	---
Conformance inspection, part 3 ^{3/}				
A	4.812	4.938	122.22	125.43
B	.855	.895	21.72	22.73
M	4.188	4.563	106.38	115.90
N	2.875	3.250	73.03	82.55
S	3.875	4.250	98.43	107.95

NOTES:

1. The total indicator reading (the sum of the positive and negative deflection shown by the indicator when measuring the eccentricity of one surface with respect to another, with the reference axis established) of the screen grid and filament contact surfaces shall not exceed .040 inch (1.02 mm) with respect to the control grid and anode contact surfaces when the latter surfaces are rotated on rollers at the points indicated by the arrows. (Conformance inspection, part 2).
2. Letters H, J, K, N, and T also represent contact surfaces.
3. Dimensions shall be checked yearly. An accept on zero defect sampling plan shall be used, with sample of three tubes with an acceptance number of zero. In the event of failure, the test will be made as a part of conformance inspection, part 2, acceptance level 6.5 (see 11/). The yearly sampling plan may be reinstated after three consecutive samples have been accepted.

FIGURE 1. Outline drawing of electron tube type 8170W.

NOTES

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

Changes from previous issue. 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 previous issue.

Custodian:

Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:

DLA - CC
(Project 5960-3742)

Review activities:

Navy - AS, CG, MC, OS
Air Force - 99

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