

INCH-POUND

MIL-PRF-1/1716B
1 October 2003
SUPERSEDING
MIL-PRF-1/1716A
25 September 1998

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, POWER
TYPE 8171

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: 12.2 pounds nominal.

ABSOLUTE RATINGS:

Parameter:	Ef	Eb	Ec2	Ec1	Ib	Pg1	Pg2	Pp	T (anode core and seal)	Cooling
Unit:	V ac	kV dc	kV dc	V dc	A dc	W	W	kW	°C	--- 1/
Maximum:										
Class C Teleg:										
up to 30 MHz:	7.5 ±5%	7.5	1.5	-500	3.0	75	250	10.0	250	---
30 to 60 MHz:	7.5 ±5%	7.0	1.5	-500	2.8	75	250	10.0	250	---
60 to 110 MHz:	7.5 ±5%	6.5	1.5	-500	2.6	75	250	10.0	250	---
Class C Teleg (Anode mod)	7.5 ±5%	5.0 2/	1.0	-500	2.5	75	250	6.65	250	---
Class AB:	7.5 ±5%	7.5	1.5	---	4.0	75	250	12.0	250	---
Test conditions:	7.5	2.0	0.75	Adj	1.0	---	---	---	---	3/

GENERAL:

Qualification: Required.

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TABLE I. Testing and inspection.

Inspection	Method	Conditions	Acceptance Level <u>5/</u>	Symbol	Limits		Unit
					Min	Max	
<u>Conformance inspection, part 1</u>							
Peak emission	1231	$e_b = e_{c2} = e_{c1} = 2.5 \text{ kv}$	0.65	is	53	---	a
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		0.65	Ic1	---	-20	μA dc
Electrode current (screen)	1256		0.65	Ic2	---	+15	mA dc
Primary-grid emission (control)	1266	Ic1 = 600 mA dc; t = 15; Ef = 9.0 V ac; anode and screen-grid grounded	0.65	Isg1	---	-35	μA dc
Primary-grid emission (screen)	1266	Ec1 = 0; t = 15; Ic2 = 550 mA dc; Ef = 9.0 V ac; anode grounded	0.65	Isg2	---	-100	μA dc
<u>Conformance inspection, part 2</u>							
Current division (method B, short pulse)	1372	$E_b = E_{c2} = 1,500 \text{ V dc};$ $E_{c1} = -600 \text{ V dc};$ $e_{gk}/i_b = 11a$	---	$\left\{ \begin{array}{l} e_{gk} \\ i_{c2} \end{array} \right.$	$\left\{ \begin{array}{l} \text{---} \\ \text{---} \end{array} \right.$	$\left\{ \begin{array}{l} 0.0 \\ 1.25 \end{array} \right.$	$\left\{ \begin{array}{l} v \\ a \end{array} \right.$
Direct-interelectrode capacitance	1331	Grounded cathode	---	$\left\{ \begin{array}{l} C_{in} \\ C_{out} \\ C_{gp} \end{array} \right.$	$\left\{ \begin{array}{l} 108.0 \\ 18.0 \\ \text{---} \end{array} \right.$	$\left\{ \begin{array}{l} 122.0 \\ 23.0 \\ 1.0 \end{array} \right.$	$\left\{ \begin{array}{l} pF \\ pF \\ pF \end{array} \right.$
Direct-interelectrode capacitance	1331	Grounded grid	---	$\left\{ \begin{array}{l} C_{in} \\ C_{out} \\ C_{pk} \end{array} \right.$	$\left\{ \begin{array}{l} 48.0 \\ 18.0 \\ \text{---} \end{array} \right.$	$\left\{ \begin{array}{l} 58.0 \\ 23.0 \\ 0.16 \end{array} \right.$	$\left\{ \begin{array}{l} pF \\ pF \\ pF \end{array} \right.$
<u>Conformance inspection, part 3</u>							
Service-life guarantee	---	<u>4/</u>	---	---	---	---	---

See footnotes at end of table.

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TABLE I. Testing and inspection - Continued.

Inspection	Method	Conditions	Symbol	Limits		Unit
				Min	Max	
<u>Conformance inspection, part 3 - Continued</u>						
<u>Periodic-check tests</u>						
RF useful output power	2214	Class AB amplifier; F = 1 MHz (min); Eb = 7.5 kV dc; Ec2 = 1.5 kV dc; Ec1/lb = 0.52 A dc; Eg1/lb = 3.42 A dc	Po	14.5	---	kW
Shock, specified pulse	1042	No voltages applied; accel = 15 G peak (min); shock = 11 ms half-sine; total impacts = 6 (3 each X and Z axes)	---	---	---	---
Shock, specified pulse end points:	---					
Electrode voltage (grid)	1261		Ec1	-95.0	-127.0	V dc
Total grid current	1266		Ic1	---	-25	μA dc
Filament current	1301	<u>2/</u>	ΔI _f	---	1.5	A ac
Vibration, mechanical	1032	No voltages 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	-95.0	-127.0	V dc
Total grid current	1266		Ic1	---	-25	μA dc
Filament current	1301	<u>2/</u>	ΔI _f	---	1.5	A ac

See footnotes at top of next page.

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TABLE I. Testing and inspection - Continued.

- 1/ Minimum airflow requirements for incoming air at 50°C maximum at sea level are shown in table I. In all cases of operation a socket that provides for forced-air cooling of the base shall be used and maximum temperature ratings shall not be exceeded. Ratings apply for bias voltage of less than -500 volts and frequencies less than 110 MHz. Air cooling of the tube base shall be increased with higher values of bias or frequency. The approximate pressure drop values shown include the EIMAC SK-300A air-system socket or equivalent, with an EIMAC SK-1306 chimney, or equivalent, with air passing in a base-to-anode direction. Airflow shall be applied before or simultaneously with the application of electrode voltages (including the filament), and should normally be maintained for a brief period after all voltages are removed to allow for tube cool-down. In cases where long life and consistent performance are factors, cooling in excess of minimum requirements is normally beneficial.

TABLE IA. Minimum airflow requirements.

Anode dissipation (watts)	Airflow (cfm)	Approximate pressure drop (In.H ₂ O)
4,000	110	0.4
6,000	200	0.8
8,000	315	1.7
10,000	445	2.8
12,000	600	4.4

- 2/ Any change in filament current resulting from the vibration or shock testing (considered individually) shall not exceed the specified limit for ΔI_f .
- 3/ In all electrical tests involving application of filament voltage, it is permissible to use an air-system socket and chimney, and forced-air cooling is permitted.
- 4/ 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.
- 5/ This specification sheet uses accept on zero defect sampling plan in accordance with MIL-PRF-1, table III.

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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 (periodic check)				
A	6.928	7.050	175.97	179.07
B	.855	.895	21.72	22.73
M	4.186	4.568	106.32	116.03
N	2.412	2.788	61.26	70.82
S	3.412	3.788	86.66	96.22

NOTES:

1. The total indicator reading (the sum of the positive and negative deflection shown by the indicator when measuring the eccentricity of the 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 shall apply.)
2. Letters H, J, K, N, and T also represent contact surfaces.
3. Top cap outline optional provided it meets requirements of dimensions B and T.

FIGURE 1. Outline drawing of electron tube type 8171 - Continued.

Custodian:
 Army - CR
 Air Force - 99
 DLA - CC

Preparing activity:
 DLA - CC
 (Project 5960-3694)

Review activities:
 Army - AR
 Air Force - 11, 19