INCH-POUND

MIL-PRF-1/1767D
16 December 2002
SUPERSEDING
MIL-PRF-1/1767C
18 July 1997

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, POWER
TYPE 8281

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: Vertical, base down or up.
Weight: 12.8 pounds (5.8 kg) nominal.

ABSOLUTE RATINGS:

Parameter:	Ef	Eb	Ec2	Ec1	Ib	Pg1	Pg2	Pp	Anode core & seal T	Cooling
Unit:	V ac	kV dc	kV dc	kV dc	A dc	W	W	kW	°C	1/
Maximum:										
C Teleg:	6.3 ± 5%	10	2	-1.5	5	200	450	15	250	---
C Telep: (anode mod)	6.3 ± 5%	8	1.5	-1.5	4	200	450	10	250	---
Class AB:	6.3 ± 5%	10	2	---	6	200	450	15	250	---
Test condition	6.3	2	0.75	Adj	1	---	---	---	---	2/

1/ Minimum airflow requirements for incoming air at 50°C maximum at sea level, for operation under 30 MHz, are shown. Additional cooling may be required for operation above 30 MHz. In all cases of operation a socket which provides for forced-air cooling of the base must be used, such as the EIMAC SK-300A, or equivalent, used with the EIMAC SK-316 Air Chimney, or equivalent, with air flowing in a base-to-anode direction. Where long life and consistent performance are factors, cooling in excess of minimum requirements is normally beneficial. Cooling air should be applied before or simultaneously with the application of electrode voltages, including the filament, and should normally be maintained for a short period after all voltages are removed to allow for tube cool-down. The cooling data shown is for the tube in a SK-300A socket with an SK-316 Air Chimney.

Anode dissipation	Sea level		10,000 feet	
	Air flow (cfm)	Approximate pressure drop (In. H_2O)	Air flow (cfm)	Approximate pressure drop (In. H_2O)
7,500 W	220	0.4	320	0.6
12,500 W	555	2.5	810	3.6
15,000 W	775	5.0	1,130	7.3

2/ In all electrical tests involving application of filament voltage an air-system socket and chimney may be used and forced-air cooling is allowable

GENERAL:

Qualification - Required.

TABLE I. Testing and inspection.

Inspection	Method	Conditions	Acceptance level 5/	Symbol	Limits		Unit
					Min	Max	
Conformance inspection, part I							
Filament current	1301	t = 120 ± 15	0.65	If	152	168	A ac
Electrode voltage (grid)	1261		0.65	Ec1	-110	-146	V dc
Total grid current	1266		0.65	Ic1	---	-25	µA dc
Electrode current (screen)	1256		0.65	Ic2	---	25	mA dc
Peak emission	1231	eb = ec2 = ec1 = 2.5 kv	0.65	is	90	---	a
Primary grid emission (grid)	1266	Pg1 = 200 W; t = 120 max or until stable; anode and g2 floating	0.65	Isg1	---	-500	µA dc
Primary grid emission (screen)	1266	Pg2 = 450 W; Ec1 = 0 V dc; t = 120 max or until stable; anode floating	0.65	Isg2	---	-500	µA dc
Conformance inspection, part 2							
Direct-interelectrode capacitance (ground cathode connection)	1331		---	Cin Cout Cgp	154 22 ---	167 27 2	pF pF pF
Direct-interelectrode capacitance (ground grid connection)	1331		---	Cin Cout Cpk	62 23 ---	72 28 0.30	pF pF pF
Current division (method B, short pulse)	1372	Eb = Ec2 = 2,000 V dc; Ec1 = -800 V dc; egk/ib = 19 a	---	egk ic2	--- ---	0 3.2	v a
Power output 1/	---	Class AB1 amp; F = 1 MHz (min); Eb = 9 kV dc; Ec2 = 2 kV dc; Ec1/Ibo = 0.1 A dc; Eg1/Ib = 3.7 A dc; Rl = 1,125 ± 5 percent; anode tank = 10 to 15	---	Po	20	---	kW (useful)

See footnotes at end of table.

TABLE I. Testing and inspection. - Continued.

Inspection	Method	Conditions	Symbol	Limits		Unit
				Min	Max	
Conformance inspection, part 3						
Service-life guarantee	2/		---	---	---	---
Shock, specified pulse 3/	1042	No voltages applied; shock = 11 ms half-sine; accel = 15 G peak (min); impacts = 6 (3 each X and Z axes)	---	---	---	---
Vibration, mechanical 3/	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 Y axes	---	---	---	---
Shock and vibration, mechanical end points:	---		---	---	---	---
Electrode voltage (grid)	1261		Ec1	-100	-146	V dc
Total grid current	1266		Ic1	---	-30	μA dc
Filament current 4/	1301		ΔIf	---	3	A ac

1/ During this test the tube shall be operated as a Class AB1 amplifier; the control gird shall not be driven positive, as indicated by grid current flow.

2/ 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.

3/ Testing shall be performed every 6 months, with eight samples and acceptance on zero defects. Separate samples may be used at the option of the manufacturer. None of the listed tests shall be considered destructive except in case of failure. In the event of failure after sampling, that specific test shall become conformance inspection, part 2; after three consecutive successful submissions, the testing may revert to the conformance inspection, part 3 tests.

4/ Any change in filament current resulting from the vibration or shock testing (considered individually) shall not exceed the specified limit for ΔIf.

5/ This specification sheet utilizes accept on zero defects sampling plan in accordance with MIL-PRF-1, table III.

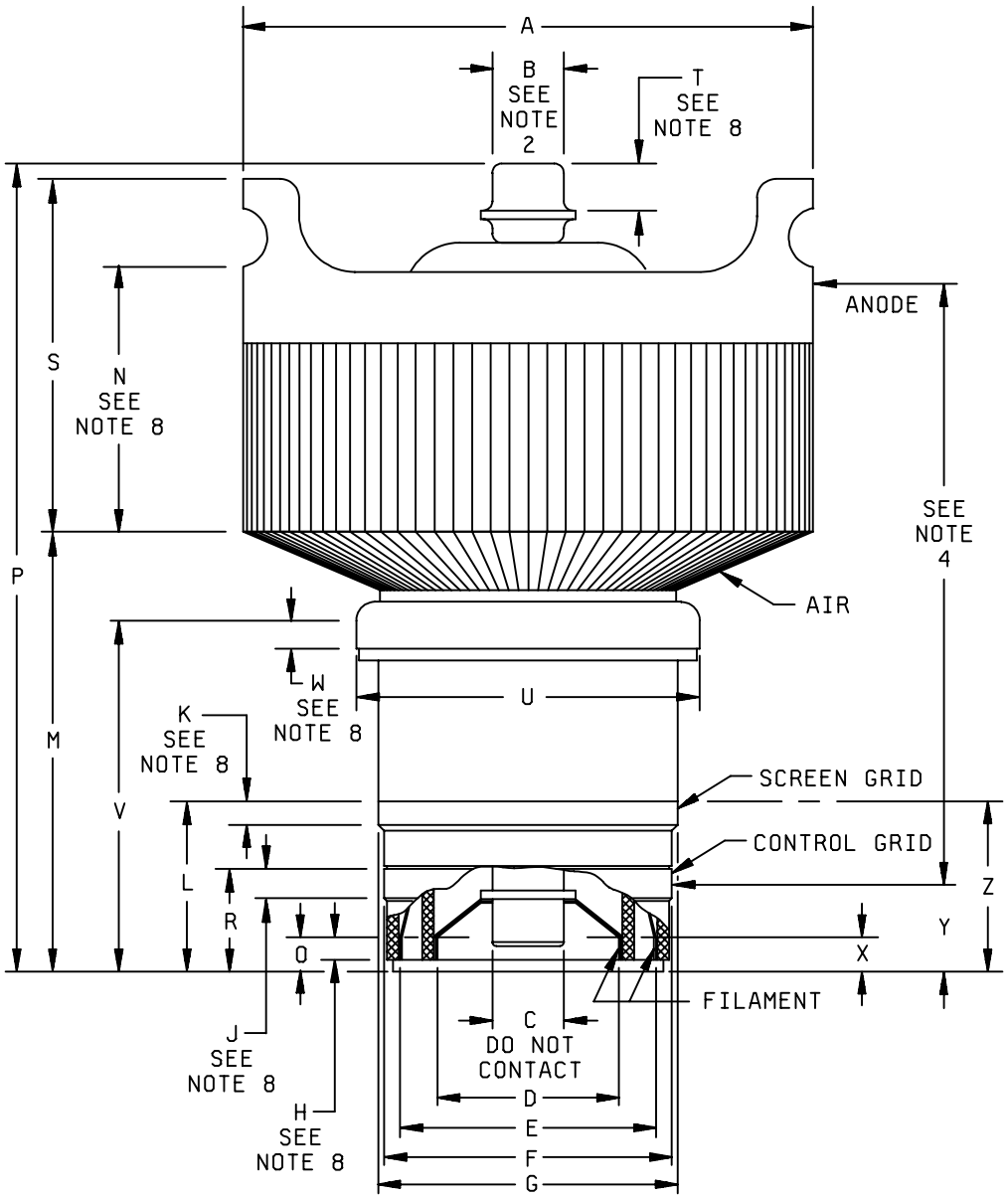

FIGURE 1. Outline drawing of electron tube type 8281.

LTR	Dimensions			
	Millimeters		Inches	
	Minimum	Maximum	Minimum	Maximum
Conformance inspection, part 2				
C	15.24	19.30	.600	.760
D	48.16	49.17	1.896	1.936
E	79.58	80.59	3.133	3.173
F	96.32	97.33	3.792	3.832
G	101.09	102.11	3.980	4.020
H	4.78	---	.188	---
J	4.78	---	.188	---
K	4.78	---	.188	---
L	43.05 BASIC (See note 5)		1.695 BASIC (See note 5)	
O	9.02 BASIC (See note 5)		.355 BASIC (See note 5)	
P	228.60	238.12	9.000	9.375
R	23.37 BASIC (See note 5)		.920 BASIC (See note 5)	
T	9.52	----	.375	---
U	111.91	113.49	4.406	4.468
V	94.44	96.04	3.718	3.781
W	5.56	---	.219	---
Conformance inspection, part 3 (See note 3)				
A	189.48	192.53	7.460	7.580
B	21.72	22.73	.855	.895
M	115.57	121.49	4.550	4.783
N	61.26	70.82	2.412	2.788
S	90.42	93.57	3.560	3.684
Reference dimensions (See notes 6 and 7)				
X	6.60		.260	
Y	20.98		.826	
Z	40.64		1.600	

NOTES:

1. The total indicator reading (T.I.R.) (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 (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. Top cap outline optional provided it meets requirements of dimensions B and T.

3. Dimensions shall be checked every 6 months, with eight samples and acceptance upon zero defects. Separate samples may be used at the option of the manufacturer. None of the listed tests shall be considered destructive except in case of failure. In the event of failure after sampling, that specific test shall become conformance inspection, part 2; after three consecutive successful submissions, the testing may revert to the conformance inspection, part 3 tests.

4. The T.I.R. of the screen grid and filament contact surfaces shall not exceed .040 (1.02 mm) with respect to the control gird and anode contact surface when the latter surfaces are rotated on rollers at the points indicated by the arrows.

5. Basic dimensions is s numerical value used to describe the theoretically exact size, shape or location of a feature or datum target. It is the basis from which permissible variations are established by tolerances on other dimensions, in notes or by feature control symbols.

FIGURE 1. Outline drawing of electron tubes type 8281 - Continued.

6. Optimum filament and grid connector heights for socket design purposes.
7. Reference or nominal dimensions are listed for information only, and are not required for inspection purposes.
8. Contact surface.

FIGURE 1. Outline drawing of electron tubes type 8281 - Continued.

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

Review activities:
Navy - AS, CG, MC, OS
Air Force - 19, 99

Preparing activity
DSCC - CC

(Project 5960-3618)