

INCH-POUND

MIL-PRF-1/1055F
w/AMENDMENT 1
5 October 2022
SUPERSEDING
MIL-PRF-1/1055F
16 December 2002

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, MICROWAVE (NEGATIVE GRID) TYPE 6442

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

Inactive for new design
after 1 April 2008

The requirements for acquiring the electron tube described herein shall consist of this document and [MIL-PRF-1](#).

DESCRIPTION: Triode, planar.

Dimensions: See figure 1. Mounting position: Any. Weight: 1 ounce nominal.

ABSOLUTE RATINGS:

Parameter:	Ef	F1	Eb	epy	Ec	Ehk	ib	lb	lc	ik
Unit:	V	GHz	V dc	kv	V dc	V dc	a	mA dc	mA dc	a
<u>Osc or amp 3/</u>										
Maximum:	5.7 <u>4/</u>	2.5	350	---	-50	±90	---	35	15	---
Minimum:	4.5	---	---	---	---	---	---	---	---	---
<u>Pulse modulated</u>										
<u>Osc or amp 5/</u>										
Maximum:	5.7 <u>4/</u>	2.5	275	---	-50	±90	---	35	15	---
Minimum:	4.5	---	---	---	---	---	---	---	---	---
<u>Anode pulsed</u>										
<u>Osc or amp 6/</u>										
Maximum:	6.3 <u>4/</u>	3.5	---	3.0	-100	±90	2.5 <u>7/</u>	2.5	1.25	3.75
Minimum:	5.7	---	---	---	---	---	---	---	---	---
<u>Class A RF amp</u>										
Maximum:	6.6	---	350	---	-25	±90	---	35	---	---
Minimum:	5.7	---	---	---	---	---	---	---	---	---
Test conditions:	6.3	---	350	---	Adj	---	---	35	---	---

See footnotes at end of table I.

AMSC N/A

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

FSC 5960



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ABSOLUTE RATINGS: - Continued.

Parameter:	ic	Pp	Pi	tp	Du	tk	T(seal)	Barometric pressure, reduced
Unit:	a	W	W	μs	---	sec	°C <u>1/</u>	mmHg <u>2/</u>
<u>Osc or amp 3/</u> Maximum: Minimum:	---	8.0 ---	12 ---	---	---	---	175 ---	20 ---
<u>Pulse modulated Osc or amp 5/</u> Maximum: Minimum:	---	6.0 ---	9.5 ---	---	---	---	175 ---	20 ---
<u>Anode pulsed Osc or amp 6/</u> Maximum: Minimum:	1.25 ---	7.5 ---	7.5 ---	2.0 ---	0.001 ---	---	175 ---	250 ---
<u>Class A RF amp</u> Maximum: Minimum:	---	8.0 ---	12 ---	---	---	---	175 ---	20 ---
Test conditions:	---	---	---	---	---	120 min	---	---

See footnotes at end of table I.

GENERAL:

| Qualification: Not Required.

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TABLE I. Testing and inspection.

Inspection	MIL-STD-1311 Method	Notes	Conditions	Acceptance Level 15/	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 1</u>		<u>10/</u>						
Pulsed oscillation	---	<u>12/ 13/</u>	F = 3.45 GHz (min); epy = 3,000 v; Rg/lb = 2.5 mA dc; tpv = 1.0 μ s $\pm$ 10% trv = 0.1 μ s (max); tfv = 0.2 μ s (max); prv/Du = 0.001 $\pm$ 5%; Ef = 6.0 V	0.65	Po	1.75	---	W (useful)
Insulation of electrodes	1211	<u>14/</u>	Ef = 6.3 V	0.65	Rgp	250	---	Meg Ω
					Rgk	25	---	Meg Ω
Emission	1231	---	Eb = Ec/lb = 40 mA dc	0.65	Eb = Ec	---	4.0	V dc
Pulsing emission	1231	---	Prr = 500 (max); tp = 1 to 3 μ s; Du = 0.0005 (min); eb = ec = etd/lb = 8a	0.65	etd	---	175	v
Electrode voltage (1) grid	1261	---		0.65	Ec	-2.5	-5.75	V dc
Total grid current	1266	---		0.65	lc	---	-0.5	μ A dc
<u>Conformance inspection, part 2</u>								
Electrode voltage (2) (grid)	1261	---	Ec/lb = 2 mA dc		Ec	-5.0	-11.5	V dc
Heater current	1301	---			If	840	960	mA
Transconductance	1306	---			Sm	13,500	19,000	μ mhos
Resonance test	---	<u>8/ 11/</u>	No voltages		---	---	---	---
Amplification factor	1316	---			Mu	35	65	---
Direct-interelectrode capacitance	1331	---	No voltages; use shielded socket in accordance with Drawing 260-JAN.		Cgp	2.10	2.45	pF
					Cgk	4.60	5.45	pF
					Cpk	---	0.045	pF
Heater-cathode leakage	1336	---	Eb = Ec = 0		lhk	---	100	μ A dc

See footnotes at end of table.

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TABLE I. Testing and inspection Continued

Inspection	MIL-STD-1311 Method	Notes	Conditions	Symbol	Limits		Unit
					Min	Max	
<u>Conformance inspection, part 3</u>							
Life test	---	---	Group C; t = 500 hours; pulsed oscillation	---	---	---	---
Life-test end point:	---						
Pulsed oscillation	---	---		ΔP_o	---	25	%

1/ Sufficient conduction and convection cooling shall be provided to limit the envelope temperature to the specified maximum of 175°C under all operating conditions.

2/ Operation at this altitude is possible in a suitably designed circuit.

3/ Modulation essentially negative may be used if the positive peak of the audio frequency envelope does not exceed 115 percent of the carrier conditions.

4/ This tube operates at frequencies where transit-time effects of the electron current shall be considered. The principal effects influencing the tube operation are the decrease in power output and operating efficiency with increase in frequency, and the bombardment and heating of the cathode by electrons from the region of the grid, which can be sufficiently severe to result in short tube life and erratic operation. Operating frequency, circuit design and adjustment, grid bias, grid current, average power input and the operating voltage contribute to some degree to the magnitude of the resulting cathode bombardment. There is a heater voltage which will maintain the cathode at the correct operating temperature for a set of operating conditions. If the conditions of operation result in appreciable cathode back-heating. It may be necessary to initiate dynamic operation of the tube at normal heater voltage, followed by a reduction of heater voltage to the proper value. A maximum variation of ± 5 percent in heater voltage is recommended where consistent operation and extended tube life is a factor.

5/ Carrier conditions for use with a maximum modulation factor of 1.0.

6/ Tube shall not be operated for more than 6 microseconds in any 5,000 microsecond interval. Tube shall not be grid-pulsed beyond the CW ratings.

7/ The regulation or series-anode-supply impedance, or both, shall limit the instantaneous peak current, with the tube considered as a short circuit, to a maximum of 10 times the specified maximum current rating.

8/ Other tube contact configurations may be used provided the tube contact area remains unchanged and the socket, jig, or cavity gives equal performance. Mounting of the socket, jig, or cavity may be at the option of the manufacturer.

9/ During the test, the maximum temperature of any part of the envelope shall be limited to 175°C maximum by conduction or forced convection cooling.

10/ All tests listed under conformance inspection, part 1, are to be performed at the conclusion of the holding period.

11/ Grid anode resonance: Test in cavity in accordance with DSCC Drawing No. D64102. Cavity shall resonate at 1.74 GHz ± 2.5 MHz with tuning slug in accordance with DSCC Drawing No. B64103 at TA = 25°C ± 5 °C.

Grid-cathode resonance. Test in cavity in accordance with DSCC Drawing No. D64102. Cavity shall resonate at 1.793 GHz ± 2.5 MHz with tuning slug in accordance with DSCC Drawing No. B64103 at TA = 25°C ± 5 °C.

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TABLE I. Testing and inspection - Continued.

When plotted on graphs of resonant frequency versus grid-anode capacitance and resonant frequency versus grid-cathode capacitance, the tube under test (TUT) shall be represented by a point within a parallelogram whose four corners are located by the following points:

Point	Capacitance (pF)		Frequency(GHz)	
	C-gp	C-gk	F-gp	F-gk
1	2.10	4.60	1.928	1.890
2	2.10	4.60	1.947	1.914
3	2.45	5.45	1.895	1.851
4	2.45	5.45	1.914	1.875

12/ Test in cavity in accordance with Drawing No. 253-JAN. Measure useful power output with the coupling and tuning adjusted for maximum power output. The tube shall operate under the given conditions and after the required circuit adjustments for a minimum of 10 seconds without arcing or instability, as evidenced by pronounced variations in the average anode current meter or the power output meter. If temporary arcing does occur during the 10-second period, the tube shall subsequently operate for 60 seconds without arcing. The test may be discontinued at the end of the 10-second period if the power output has not completely stabilized but is rising. If the power output is falling, the test will be continued until a stable reading is obtained. For qualification purposes, a stabilized reading shall be obtained. All readings shall be "nonsquegging" power.

13/ The pulse characteristics are defined as follows:

- epv is the smooth peak voltage excluding spike (see method 1296 of [MIL-STD-1311](#)).
- The interval of trv and tfv is between 20 and 85 percent of the smooth peak value of the voltage pulse.
- The definition of tp is applicable to tpv.
- The parameter tpv, tfv, and trv may be measured with the tube replaced by a 1,000-ohm noninductive resistor. The load VSWR shall be 1.5 maximum.

14/ The insulation between the grid and the cathode shall be measured with a voltage of 100 V dc. The other insulation test shall be made in accordance with method 1211 of [MIL-STD-1311](#).

15/ Acceptance shall be based upon accept on zero defect (c = 0) sampling plan, in accordance with table III of [MIL-PRF-1](#).

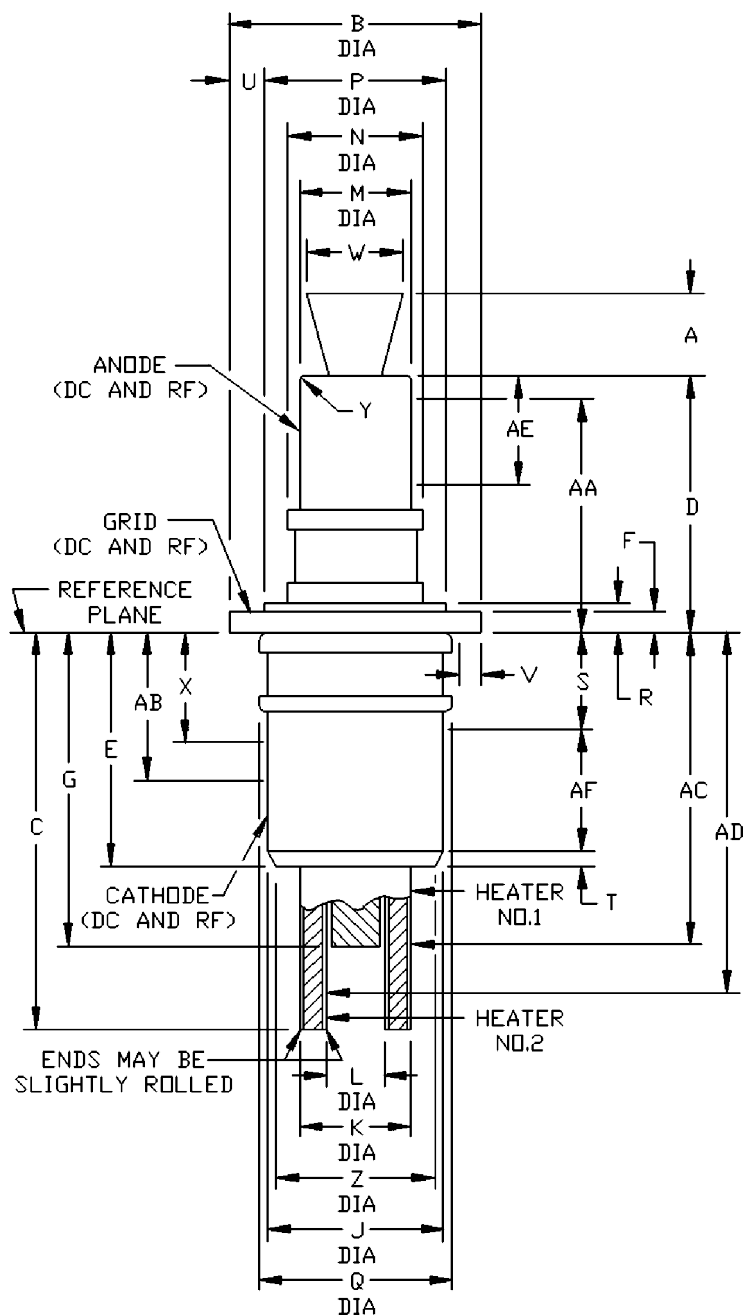


FIGURE 1. Outline drawing of electron tube type 6442.

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Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
Conformance inspection, part 2					
A	---	.250	---	6.35	
B	.810	.818	20.57	20.77	
C	1.219	1.281	30.96	32.53	
D	.953	.984	24.21	24.99	
E	.750	.813	19.05	20.65	
F	.070	.078	1.78	1.98	4, 5
G	---	1.016	---	25.80	
J	.539	.549	13.69	13.94	6
K	.318	.328	8.08	8.33	
L	.180	.190	4.57	4.82	
M	.365	.371	9.27	9.42	
AE	.429	---	10.90	---	4
Conformance Inspection ,					3
N	---	.453	---	11.50	
P	.560	.570	14.22	14.47	
O	---	.609	---	15.46	
R	.077	.097	1.96	2.46	
S	---	.266	---	6.75	
T	.015	.090	0.38	2.28	
W	---	.285	---	7.24	1
X	---	.375	---	9.52	7
Z	.490	.520	12.45	13.20	
Reference dimensions					
U	.094		2.39		4, 5
V	.094		2.39		4, 5
Y	.016 R		0.41 R		
AA	.750		19.50		2
AB	.547		13.89		2
AC	1.000		25.40		2
AD	1.109		28.17		2
AF	.453		11.51		4

FIGURE 1. Outline drawing of electron tube type 6442 - Continued.

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NOTES:

1. Exhaust tubulation shall not be subjected to any mechanical stress.
2. Eccentricity shall be gauged at points designated and what shall be as follows (note 3 shall apply):

Contact	Eccentricity		Reference
	Inches	Millimeters	
Anode Cathode	.010 max	.25	Grid contact Grid contact Grid contact contact Grid contact Grid contact Grid contact
Anode-cathode	.010 max	.25	
Heater No. 1	.020 TIR	.51	
Heater No. 2	.015 max	.38	
Heater No. 1 and 2	.015 max	.38	
	.030 TIR	.76	

3. These dimensions shall be tested on 10 tubes per month when in continuous production. Failure of more than one tube to meet tolerances for any dimension shall cause that dimension to become, for all lots in process, part of conformation inspection, part 2.
4. Contact surface shall be confined to this area.
5. Only these surfaces shall be used for tube stops or clamping.
6. Maximum diameter shall not be increased by solder.
7. Tube marking shall be confined to this area.

FIGURE 1. Outline drawing of electron tube type 6442 - Continued.

Referenced documents. In addition to [MIL-PRF-1](#), this document references

[MIL-STD-1311](#)

Drawing 253-JAN

Drawing 260-JAN

DSCC Drawing No. D64102

DSCC Drawing No. B64103

NOTE: To obtain copies of JAN drawings, please send a request via email to TubesAmps@dla.mil.

Amendment notations. The margins of this specification sheet are marked with vertical line to indicate modifications generated by this amendment. 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.

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Army - CR

Navy - EC

Air Force - 85

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Preparing activity:

DLA - CC

(Project 5960-2022-016)

Review activities:

Navy - AS, CG, MC, OS

Air Force - 19

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