

INCH-POUND

MIL-PRF-1/1679B
23 September 1999
SUPERSEDING
MIL-E-1/1679A
6 June 1975

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, POWER
TYPE 8252W

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, pulse modulator.
See figure 1.
Mounting position: Any.
Weight: 12 ounces (340.2 grams) nominal.

ABSOLUTE RATINGS: Pulse modulation.

Parameter:	Ef	Eb	Ec1	ec1	Ec2	Pp	Pg2	Pg1	tk	ib	Seal temp (glass)	Seal temp (ceramic)
Unit:	V	kV dc	V dc	v	kV dc	W	W	W	sec	a 1/	°C	°C
Maximum:	28.6	20	-1,000	300	1.5	60	8	1	---	18	200	250
Minimum:	23.4	---	---	---	---	---	---	---	180	---	---	---
Test conditions:	25.0	1.2	---	---	1.0	---	---	---	180	---	11/	11/

See footnotes at end of table 1.

GENERAL:

Qualification - Required.

TABLE I. Testing and inspection.

Inspection	Method	Notes	Conditions	Acceptance Level <u>13/</u>	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection part 1</u>								
Peak emission	1231	<u>6/</u>	ec1 = ec2 = eb = 1,000 v; tk = 300 (min)	0.65	is	45	---	a
Electrode current (screen)	1256	---	Ec1/lb = 100 mA dc; Eb = 150 V dc; Ec2 = 100 V dc	0.65	lc2	0	5.0	mA dc
Electrode voltage (1) (grid)	1261	---	Ec1/lb = 50 mA dc	0.65	Ec1	-190	-290	V dc
Electrode voltage (2) (grid)	1261	---	Ec1/lb = 1.0 mA dc	0.65	Eco	---	-350	V dc
Total grid current	1266	<u>2/ 6/</u>	Ec1/lb = 50 mA dc	0.65	lc1	---	-20	μA dc
Primary grid emission (control)	1266	<u>10/</u>	lc1 = 65 mA dc; t = 15 sec; anode and screen grid floating	0.65	lsg1	---	-50	μA dc
Primary grid emission (screen)	1266	<u>10/</u>	Ec1 = 0; t = 15 sec; lc2 = 100 mA dc; anode floating	0.65	lsg2	---	-150	μA dc
Grid-pulse operation (1)	1356	<u>3/ 6/</u>	Ec1 = -800 V dc; Ebb = 25 kV dc; Ec2 = 1,350 V dc; Rl = 1,030 to 1,070 ohms; t = 300 sec (max)	0.65 0.65 0.65	iL ΔiL lc2	20 ---	--- 10 Never negative	a %
<u>Conformance inspection part 2</u>								
Heater current	1301	---	Ef = 27.0 V	---	If	1.95	2.35	A
Torque	---	<u>4/</u>		---	---	---	---	---
Direct-interelectrode capacitance	1331	---	Cathode grounded	---	{ Cgp Cin Cout	{ --- 35 6.0	{ 2.0 50 11	{ pF pF pF
Grid-pulse operation (2)	1356	<u>3/</u>	Ec1 = -800 V dc; Ebb = 20 kV dc; Ec2 = 1,250 V dc; Rl = 1,050 to 1,100 ohms; t = 300 sec (max)	---	iL ΔiL lc2	16 ---	--- 10 Never negative	a %

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Notes	Conditions	Acceptance Level <u>13/</u>	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection part 3</u>								
Life test (1)	---	<u>3/ 8/</u>	Group C; Ebb = 20 kV dc; Ec1 = -800 V dc Ec2 = 1,250 V dc; Rl = 1,030 to 1,070 ohms; Du = 0.001; t = 500 hours	---	---	---	---	---
Life-test end points (1)	---							
Grid-pulse operation (2)	1356	---		---	iL	15	---	a
Total grid current	1266	---		---	Δ iL	---	15	%
Peak emission	1231	---		---	Ic1	---	-100	μ A dc
Primary grid emission (control)	1266	---		---	is	40	---	a
Primary grid emission (screen)	1266	---		---	Isg1	---	-50	μ A dc
Life test (2)	---	<u>9/</u>	Group C; Ef = 27.0 V Ec1 = -90 V dc (min); anode and screen grid floating; t = 500 hours	---	---	---	---	---
Life-test end point (2)	---							
Heater current	1301	<u>9/</u>	Ef = 27.0 V	---	If	1.95	2.35	A
Vibration	---	<u>5/ 12/</u>	Ef = 24 V; Ebb = 250 V dc; Rl = 2,500 ohms; Ec2 = 90 V dc; Ec1/Ib = 5.0 mA dc; F = 10 to 200 Hz; DA = 0.08 inch; 10 to 50 Hz; accel = 10G; 50 to 200 Hz	---	Ep	---	1.5	V ac
Vibration end point:	---							
Grid-pulse operation (2)	1356	---		---	iL	16	---	a
					Δ iL	---	10	%
					Ic2	Never negative		

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Notes	Conditions	Acceptance Level <u>13/</u>	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection part 3 - Continued</u>								
Long-duration shock	---	<u>7/ 12/</u>	Ef = 25.0 V; no other voltages applied; shock = 50 G peak (min); duration = 11 ±2 ms; total impacts = 18; X, Y, and Z axes	---	---	---	---	---
Long-duration shock end-point:	---							
Grid-pulse operation (2)	1356	---		---	iL ΔiL Ic2	16 --- Never negative	--- 10	a %

1/ The drive pulse t_r and t_f significantly effect anode dissipation. In all cases of operation, the rated element dissipation shall not be exceeded. The information contained on figure 2 may be used as a guide to safe cathode current for various combinations of pulse repetition rate and pulse duration.

2/ Tube to operate with constant or decreasing grid current for 2 minutes. If the tube should operate with a rise of grid current, the grid current shall become constant or decrease within 5 minutes.

3/ Driver pulse duration 2 μ s minimum, measured at 95 percent of maximum amplitude, with a t_r less than 0.2 μ s and a t_f less than 0.4 μ s. Variation in amplitude over 80 percent of the top portion of the pulse shall be not more than 5 percent. Pulse repetition rate shall be 300 to 500, with the exact frequency at the option of the manufacturer.

Input signal to the control grid shall drive the grid positive by 225 ±25 volts at the top of the pulse.

The variation of amplitude of the output pulse shall be not greater than specified.

The tube shall operate for a 2-minute period without arcing within the tube which would kickout the overcurrent relay.

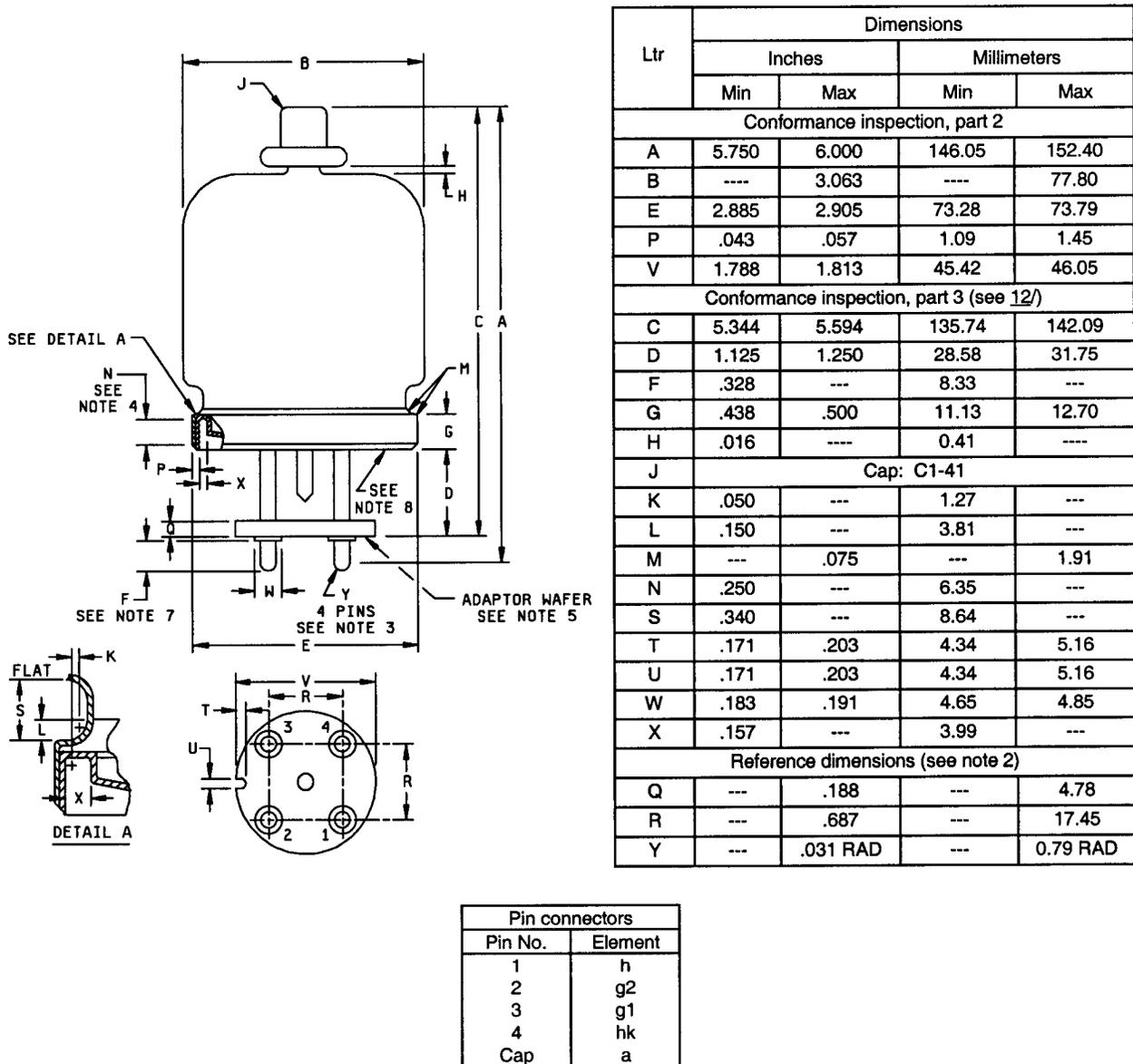
Tube shall be tested in the circuit shown on figure 3, or equal.

A Westinghouse type MN overcurrent relay, style 1158584 (Navy type CAY29095), or equal, which has a 50 to 200 mA dc range shall be used in conjunction with an ac control relay in grid-pulse operation testing and life testing of this tube type. The dc overcurrent relay shall be equipped with coil No. 1158882 and shall be adjusted to 200 mA dc. The ac control relay used in conjunction with the dc overcurrent relay shall open the ac line approximately 20 milliseconds after the overcurrent relay opens. A device shall be incorporated into the relay circuit which will delay the reapplication of anode voltage for a minimum period of 15 seconds after each kickout and shall count the number of kickouts.

4/ The adapter wafer shall be subjected to a gradually applied torque of 12.0 pound-inches. This test shall not cause broken leads, broken welds, broken soldered joints, broken glass, or cracked glass.

TABLE I. Testing and inspection - Continued.

- 5/ The tube under test (TUT) shall be vibrated (simple harmonic motion) with an ascending sweep only. Each tube shall be vibrated in the X, Y, and Z axes, under the specified conditions. The impedance of the anode and screen voltage supplies shall not exceed that of a 40 μ F capacitor at 10 Hz. The value of the alternating voltage (E_p) produced across the resistor (R_p) shall be measured with a suitable device. This device shall have an appropriate voltage range and shall have the ability to measure, with an error of less than 10 percent, the rms value of a sine wave of voltage at all frequencies from 20 to 5,000 Hz. Thermal or VU meters may be used provided the shunting effect on the anode load does not result in an error greater than the 10 percent allowed above. The time for covering the sweep range of 10 to 50 Hz shall be 3 minutes minimum, with the time for covering the range of 10 to 200 Hz being 4 to 15 minutes. Each tube shall be vibrated for 60 seconds at the frequency which gives the maximum vibration output voltage in each of the three axes. If at the end of 60 seconds, the vibration output is increasing, the vibration shall be continued until there is no further increase.
- 6/ The tests listed below shall be the first tests performed after the holding period in the following order:
- First: Peak emission
Second: Total grid current
Third: Grid-pulse operation (1)
- 7/ The TUT shall be shocked in the X, Y, and Z axes, with six blows in each axis. An approved short tester shall be used to indicate any shorts between the cathode and control grid and between the control grid and screen grid. No permanent shorts or temporary shorts are allowed during the test. The applied shock shall be an approximate half-sine wave motion, with duration measured at the zero axis level.
- 8/ During life test, any tubes which will kick out the overcurrent relay one time or more in any 24-hour period shall be considered a failure, excluding an initial stabilization period of 15 minutes.
- 9/ Heater voltage shall be cycled approximately 5 minutes "on" and 25 minutes "off". No grid-cathode shorts are permitted during or after life test. The specified minimum $t = 500$ hours includes 1,000 complete "on-off" cycles. For qualification, data on a sample of 10 tubes shall be submitted.
- 10/ Primary-grid-emission tests shall be made in a circuit with suitable rectifiers and resistors, to limit the voltage applied to the grid under test during the heating half-cycles, while allowing the emission measurement to be made at 110 volts rms for the control grid and 750 volts rms for the screen grid during the measuring half-cycles.
- 11/ In all cases of operation with ambient temperature above 25°C, above sea level, poor ventilation, or a combination of these factors, a heat dissipating connector is allowable on the anode terminal cap. Adequate ventilation may be provided and the maximum temperature rating for envelope and seals shall not be exceeded.
- 12/ Test to be performed every three months, utilizing an accept on zero defect sampling plan.
- 13/ This specification uses an accept on zero ($c = 0$) sampling plan in accordance with MIL-PRF-1, Table III.



NOTES

1. There shall be an electrical tie between pin 4 and clamping flange.
2. Dimensions without tolerances are for information and are not required for inspection purposes.
3. Pins shall enter gage .250 inch (6.35 mm) thick, with four holes .214 inch (5.44 mm) diameter located on .687 inch (17.45 mm) centers and with center hole .250 inch (6.35 mm) diameter.
4. Defines cylindrical surface available for clamping which must not be deformed by action of clamps.
5. The adapter wafer will not be removed.
6. Dimensions optional where not specified.
7. Defines length available for contact.
8. Tube base envelope material shall be approved type ceramic.

FIGURE 1. Outline drawing of electron tube type 8252W.

DO NOT EXTRAPOLATE ABOVE OR TO THE RIGHT OF BOLD LINES

SOLID LINES REPRESENT CONSTANT REPETITION RATES
DASHED LINES REPRESENT CONSTANT DUTY FACTORS

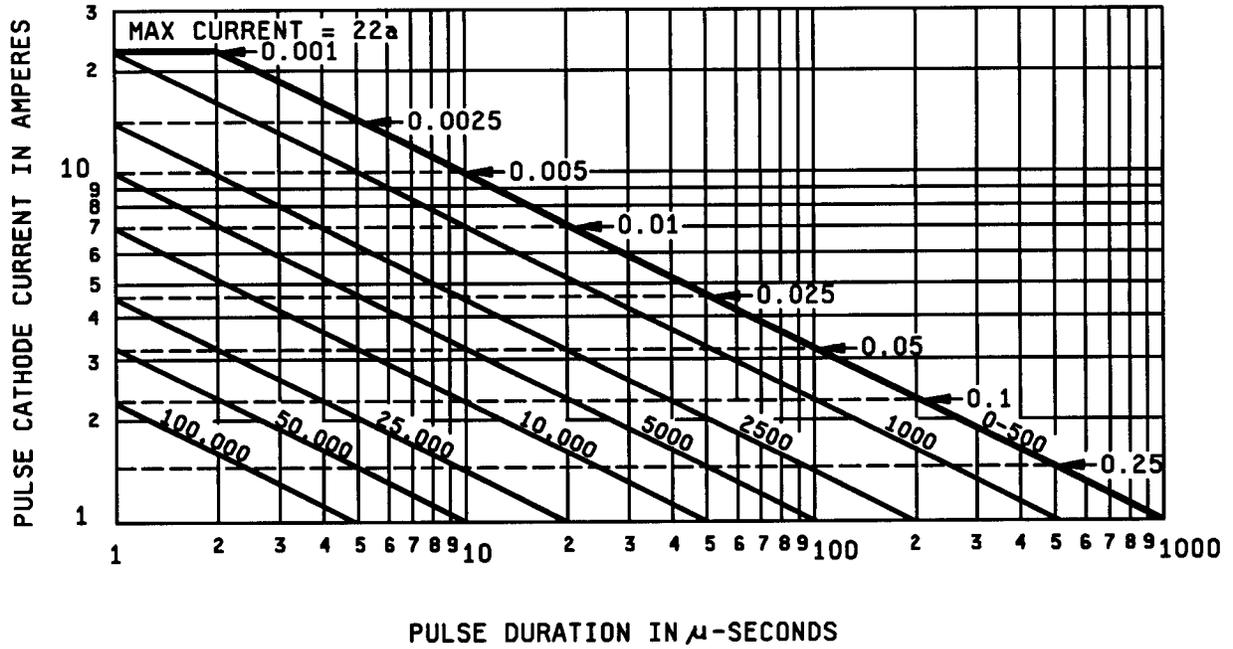


FIGURE 2. Pulse cathode current versus pulse duration. 1/

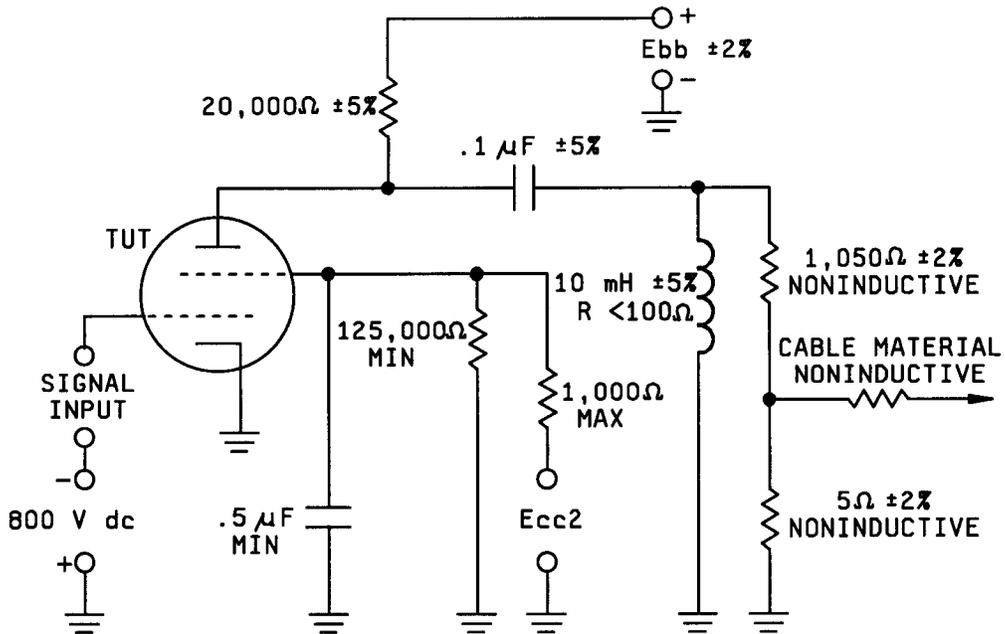


FIGURE 3. Circuit for grid pulse operation test.

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

Preparing activity:
 DLA - CC
 (Project 5960-3481)

Review activities:
 Army - AR, AV, CR4, MI
 Navy - AS, CG, MC, OS, SH
 Air Force - 19, 99