

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, POWER
TYPES 7203 AND 7203A

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

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

DESCRIPTION: Tetrode, ceramic-metal.
See [figure 1](#) (required for interchangeability).
Mounting position: Any.
Weight: 4 ounces nominal (113.4 grams).

ABSOLUTE RATINGS: C Telegraphy

Parameter:	F1	Ef	Eb	Ec1	Ec2	Ehk	Ib
	MHz	Vac	Vdc	Vdc	Vdc	Vdc	mAdc
Maximum:	500	---	2,000	-250	300	±150	250
Minimum:	---	<u>1</u> /	---	---	---	---	---
Test conditions:	---	6.0	1,000	Adj	300	0	150

Parameter:	Pg1	Pg2	Pp	T (seal and anode core)	tk	Cooling
	W	W	W	°C	sec	
Maximum:	2	12	250	250	---	---
Minimum:	---	---	---	---	30	<u>2</u> /
Test conditions:	---	---	---	---	120	<u>3</u> /

See footnotes at the end of table 1.

GENERAL:
Qualification - Required.
This specification sheet uses accept on zero defect sampling in accordance with [MIL-PRF-1](#), table III.



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TABLE I. Group A inspection - Continued.

Inspection	Method MIL-STD-1311	Conditions	Symbol	Limits		Unit
				min	max	
<u>Conformance inspection, part 1</u>						
Electrode current (screen) Type 7203 Type 7203A	1256		I_{c2}	-7.0 -7.0	+3.0 0.0	mAdc mAdc
Electrode voltage (grid)	1261		E_{c1}	-32.0	-45.0	Vdc
Total grid current <u>7/</u>	1266	$E_b = 2,000$ Vdc; $E_{c1}/I_b = 125$ mAdc	I_{c1}	---	-15	μ Adc
Primary grid emission (control)	1266	$I_{c1} = 70$ mAdc; $t = 120$; anode and screen grid floating	I_{sg1}	---	-250	μ Adc
Primary grid emission (screen)	1266	$E_{c1} = 0$; $t = 120$; $I_{c2} = 100$ mAdc; anode floating	I_{sg2}	---	-250	μ Adc
Heater current	1301		I_f	2.30	2.90	Aac
Current division (long pulse)	1372	$E_b = E_{c2} = 250$ Vdc; $E_{c1} = -100$ Vdc; $egk/I_b = 1.0$ a; $prr = 11.0 \pm 1.0$; $t_p = 4,500$ μ s (min)	egk i_{c1} i_{c2}	8 --- ---	18 200 260	V ma ma
Pulse emission <u>6/</u>	2212	$E_b = E_{c2} = 250$ Vdc; $E_{c1} = -100$ Vdc; $egk/I_k = 1.5$ a; $E_f = 5.4$ V ac; $prr = -11.0 \pm 1.0$; $t_p = 4,500$ μ s (min)	Δi_k	---	200	ma
<u>Conformance inspection, part 2</u>						
Direct-inter-electrode capacitance	1331	EIA standard shields No. 320 and 321, or equivalent	C_{gp} C_{in} C_{out}	--- 14.2 4.0	0.06 17.2 5.0	pF pF pF
Heater-cathode leakage	1336	$E_{hk} = +150$ Vdc; $E_{hk} = -150$ Vdc	I_{hk} I_{hk}	--- ---	150 150	μ Adc μ Adc
RF useful power output <u>8/</u>	2214	class c amplifier; $F = 470$ to 500 MHz; $E_b = 2,000$ V dc; $E_{c1} -90$ Vdc; $E_{c2} = 250$ to 300 Vdc; $I_{c1} = 25$ mAdc (max); $E_{g1}/I_b = 250$ mAdc; $E_f = 5.5$ Vac	P_o	225	---	W

See footnotes at end of table.

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TABLE I. Group A inspection - Continued.

Inspection	Method MIL-STD-1311	Conditions	Symbol	Limits		Unit
				min	max	
Conformance inspection, part <u>3</u>						
Life test (1)	---	group C; rf useful power output	t	500	---	hrs
Life-test (1) end points:	---	-----				
Primary grid emission (control)	1266	Ic ₁ = 70 mAdc; t = 120; anode and screen grids floating	Isg ₁	---	-250	μA dc
Primary grid emission (screen)	1266	Ec ₁ = 0; Ic ₂ = 100 mAdc; t = 120; anode floating	Isg ₂	---	-250	μA dc
Heater-cathode leakage	1336	Ehk = +150 Vdc; Ehk = -150 Vdc	Ihk	---	150	μA dc
			Ihk	---	150	μA dc
Pulse emission <u>6/</u>	2212	Eb = Ec ₂ = 250 Vdc; Ec ₁ = -100 V dc; egk/ik = 1.5 a; Ef = 6.0 V ac; prf = 11 ±1.0; tp = 4,500 μs (min)	Δik	---	100	mA
RF useful power output <u>8/</u>	2214	class c amplifier; F = 470 to 500 MHz; Eb = 2,000 V dc; Ec ₁ -90 Vdc; Ec ₂ = 250 to 300 Vdc; Ic ₁ = 25 mAdc (max); Eg ₁ /Ib = 250 mAdc; Ef = 5.5 Vac	Po	200	---	W
Life test (2)	---	Group C; Eb = Ec ₁ = Ec ₂ = 0; Ef = 6.6 Vac	t	500	---	hrs
Life-test (2) end points:	---					
Inter-element leakage resistance, cold <u>9/</u>	1366	E = 100 Vdc: g ₁ negative E = 500 Vdc: g ₁ negative g ₂ positive g ₂ negative	Rg ₁ k	10	---	MegΩ
			Rg ₁ g ₂	10	---	MegΩ
			Rg ₂ k	10	---	MegΩ
			Rg ₂ p	10	---	MegΩ
Low-frequency vibration <u>10/</u>	1031	No voltages	----	---	---	--
Shock, specified pulse <u>10</u>	1042	No voltages; 15 G (min); 11 ±2 ms; half sine wave				

See footnotes at end of table

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TABLE I. Group A inspection - Continued.

Inspection	Method MIL-STD-1311	Conditions	Symbol	Limits		Unit
				min	max	
<u>Conformance inspection, part 3</u> - continued						
Life test (3)	---	RF useful output; airflow = 1.5 cfm	t	100	---	hrs
Life-test (3) end points:	---					
RF useful power output <u>8/</u>	2214	class c amplifier; F = 470 to 500 MHz; Eb = 2,000 Vdc; Ec ₁ -90 Vdc; Ec ₂ = 250 to 300 Vdc; Ic ₁ = 25 mAdc (max); Eg ₁ /Ib = 250 mAdc; Ef = 5.5 Vac	Po	200	---	W
Humidity <u>10/</u>	1011	14 days duration; Ic ₁ = -20 μ A dc (max) under post test conditions	---	---	---	---
Forced cooling <u>4/</u>	1143	Ec ₁ /Ib = 250 mAdc	T(anode core)	---	225	°C
Coolant-pressure drop versus coolant flow (forced air) <u>5/</u>	1155	No voltages	---	---	0.35	Inch H ₂ O

NOTES:

- 1/ Maximum life may be obtained by adjusting the heater voltage in accordance with the application. The heater voltages (nominal and derated) shall be maintained within ± 5 percent (but not less than 5.4 V ac) when consistent operation and extended tube life are factors. A table of heater voltage versus frequency is presented as a guide for straight-through amplifier operation:

<u>F (MHz)</u>	<u>Ef (V ac)</u>
Up to 300	6.00
301 to 400	5.75
401 to 500	5.50

- 2/ When the TUT is operated at 100 percent of maximum rated anode dissipation at an incoming air temperature of 25°C maximum, a minimum air flow of 3.8 cubic feet per minute (cfm) at sea level, shall pass through the anode cooler. The static pressure drop across the TUT and socket (see Drawing 246-JAN) at an airflow of 3.8 cfm is approximately 0.30 inch of water. The pressure drop varies with the amount of escaping air and with the shape and construction of the air director. This rating applies at bias voltages less than 100 volts and frequencies less than 500 MHz. Air cooling on the TUT base shall be increased with increasing negative-grid bias or with increasing frequency, or a combination of both. In all cases of operation, a socket which provides forced-air cooling of the base shall be used and maximum seal temperature ratings must not be exceeded. The airflow shall be applied before or simultaneously with electrode voltages, and may be removed simultaneously with them.

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- 3/ The socket shown on Drawing 246-JAN shall be used in all electrical tests involving heater voltage. Forced-air cooling is permitted at the rate of 4.0 cfm maximum for the base and anode, unless otherwise specified in the specific test conditions. A separate source may be used for the base and anode, but neither shall exceed 4.0 cfm.
- 4/ The forced cooling test shall be made as follows: At an ambient temperature of 25°C, both base and anode shall be cooled by an airflow of 3.8 cfm maximum at sea level from a single source using the infinite baffle system shown on [figure 2](#), or equivalent. At the specified test conditions, the anode core temperature shall not exceed the specified limits. Temperature shall be measured by means of a thermocouple embedded in the top of the core, adjacent to the cooler. This shall be done by drilling a small hole, shallow enough so that the tube vacuum shall not be lost, placing the welded thermocouple junction therein, and then peening the edges of the hole to hold the thermocouple firmly in place. In all cases, good electrical continuity between the thermocouple and the metal area in close proximity shall be demonstrated before the cooling test can be performed.
- 5/ An infinite baffle system ([figure 2](#), or equivalent) with an airflow of 3.8 cfm at sea level shall be used. The static pressure drop is measured across the TUT and socket.
- 6/ The input wave shape shall have a tr and tf of 25 μ s maximum each, and the slope of the top of the pulse shall not be greater than 0.5 percent with a ripple not greater than 0.1 percent.
- 7/ This test shall be the first test performed at the conclusion of the holding period.
- 8/ The circuit and cavity shall be in accordance with Drawing 223-JAN.
- 9/ This test shall be made 30 minutes after Ef is turned off. Rated airflow shall be maintained during this 30 minute interval. Measurement with General Radio Megometer Model No. 1862C, or equivalent. Unused elements are to be left floating.
- 10/ At the conclusion of this test, the TUT shall satisfy the requirements of the total grid current test (method 1266) specified herein under conformance inspection, part 1.

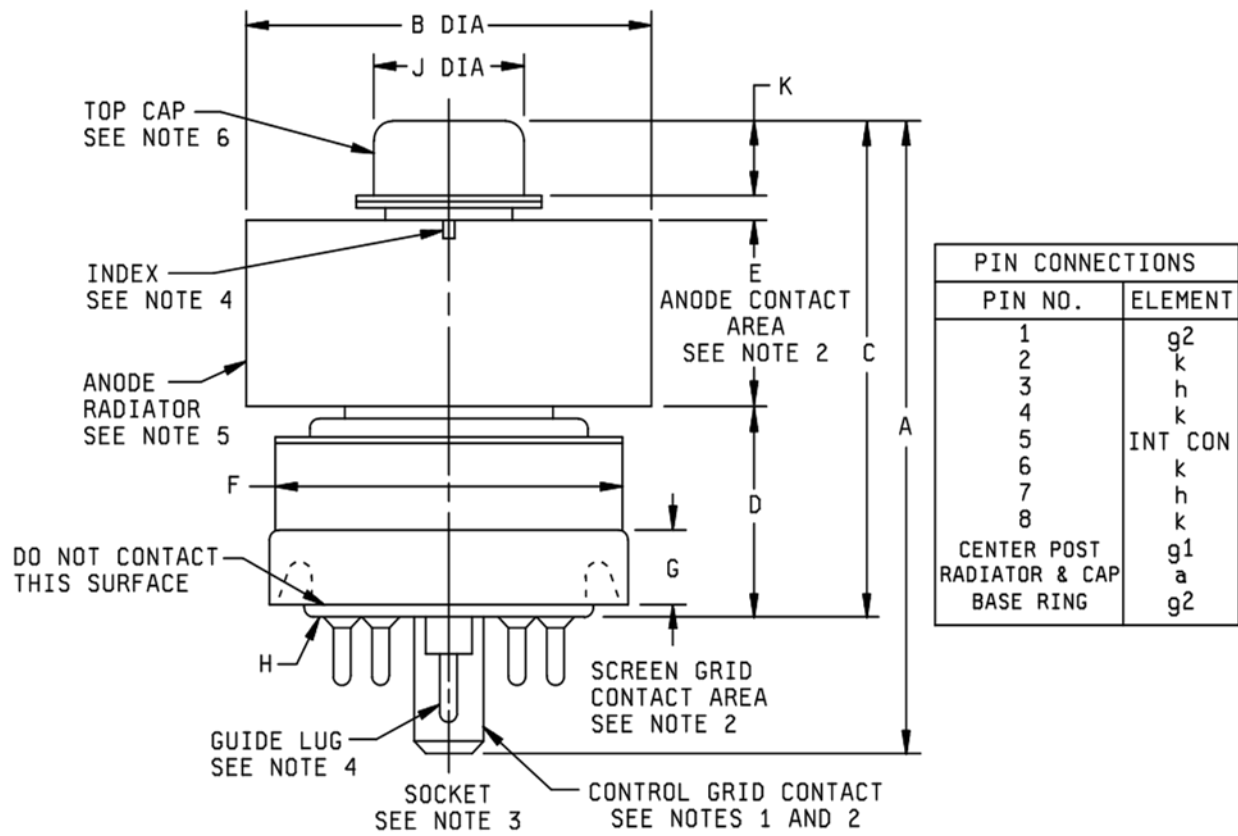


FIGURE 1. Outline drawing of electron tube types 7203 and 7203A.

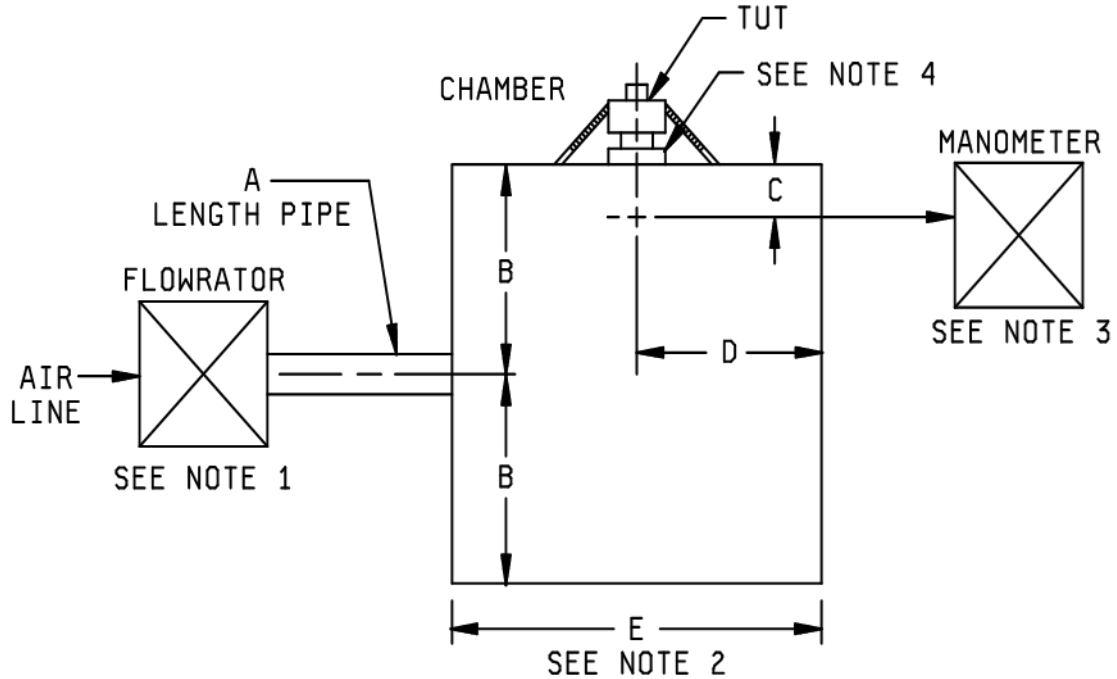
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LTR	Dimensions			
	Millimeters		Inches	
Conformance, inspection part 2				
	Min	Max	Min	Max
A	59.03	62.59	2.324	2.464
C	45.97	48.51	1.810	1.910
Conformance inspection, part 3				
B	40.89	41.66	1.610	1.640
D	19.05	20.57	.750	.810
E	18.03	20.07	.710	.790
F		35.71		1.406
G	4.75		.187	
H	Base: B8-236 (see note 1)			
J	14.20	14.55	.559	.573
K	6.10		.240	

NOTES:

1. Pin alignment shall be checked by means of gage GB8-3. Dimensions of control-grid contact shall be inspected by means of gages specified on Drawing 246-JAN and shall be inspected during conformance inspection, part 2.
2. Alignment of anode, screen-grid, and control-grid contact surfaces shall be determined by means of a gage specified on Drawing 168-JAN. Conformance inspection, part 2, shall apply.
3. Air-system socket shall be as specified on Drawing 246-JAN, EIMAC SK-600, or equivalent.
4. Location of guide lug of control-grid contact shall be referenced by a notch or arrow on the anode radiator in position shown.
5. Anode clamping shall be confined to anode radiator.
6. Top cap outline optional provided it meets requirements of dimensions J and K.

FIGURE 1. Outline drawing of electron tube types 7203 and 7203A - Continued.



Ltr	Dimensions (nominal)	
	Millimeters	Inches
A	19.05 ID x 50.80 length pipe	.750 ID x 2.000 length pipe
B	152.40	6.000
C	50.80	2.000
D	152.40	6.000
E	304.80	12.000

NOTES:

1. Fisher Porter flowrator model B4-27-10/77, or equivalent.
2. 12 inch (304.80 mm) cube inside dimensions, compound sealed.
3. F.W. Dwyer manometer, 0 to 1 inch (25.40 mm) of water (Fisher Scientific Company 11-295-5 draft gage), or equivalent.
4. Socket specified on drawing 246-JAN.

FIGURE 2. Baffle system.

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

[MIL-STD-1311](#)
DWG 168-JAN
DWG 223-JAN
DWG 246-JAN

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

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Navy - EC
Air Force - 85
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(Project 5960-2024-018)

Review activities:
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