INCH-POUND

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SUPERSEDING
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1 October 1996

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 the latest issue of 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 MHz	Ef Vac	Eb Vdc	Ec1 Vdc	Ec2 Vdc	Ehk Vdc	Ib mAdc
Maximum:	500	---	2,000	-250	300	±150	250
Minimum:	---	1/	---	---	---	---	---
Test conditions:	---	6.0	1,000	Adj	300	0	150

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

See footnotes at the end of table 1.

GENERAL: Qualification - Required.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Defense Supply Center Columbus, ATTN: DSCC-VAT, 3990 East Broad Street, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

TABLE I. Group A inspection.

Inspection	Method	Conditions	Acceptance level 12/	Symbol	Limits		Unit
					min	max	
Conformance inspection, part 1							
Electrode current (screen) Type 7203 Type 7203A	1256		0.65	Ic_2	 -7.0 -7.0	 +3.0 0.0	 mAdc mAdc
Electrode voltage (grid)	1261		0.65	Ec_1	-32.0	-45.0	Vdc
Total grid current 7/	1266	Eb = 2,000 Vdc; Ec_1/Ib = 125 mAdc	0.65	Ic_1	---	-15	µAdc
Primary grid emission (control)	1266	Ic_1 = 70 mAdc; t = 120; anode and screen grid floating	0.65	Isg_1	---	-250	µAdc
Primary grid emission (screen)	1266	Ec_1 = 0; t = 120; Ic_2 = 100 mAdc; anode floating	0.65	Isg_2	---	-250	µAdc
Heater current	1301		0.65	If	2.30	2.90	Aac
Current division (long pulse)	1372	Eb = Ec_2 = 250 Vdc; Ec_1 = -100 Vdc; egk/ib = 1.0 a; prr = 11.0 ±1.0; tp = 4,500 µs (min)	0.65	egk ic_1 ic_2	8 --- ---	18 200 260	V ma ma
Pulse emission 6/	2212	Eb = Ec_2 = 250 Vdc; Ec_1 = -100 Vdc; egk/ik = 1.5 a; Ef = 5.4 V ac; prr = -11.0 ±1.0; tp = 4,500 µs (min)	0.65	∆ik	---	200	ma
Conformance inspection, part 2							
Low-frequency vibration 10/	1031	No voltages		---	---	---	---
Shock, specified pulse 10/	1042	No voltages; 15 G (min); 11 ±2 ms; half sine wave		---	---	---	---
Direct-inter-electrode capacitance	1331	EIA standard shields No. 320 and 321, or equivalent		Cgp Cin Cout	--- 14.2 4.0	0.06 17.2 5.0	pF pF pF
Heater-cathode leakage	1336	Ehk = +150 Vdc; Ehk = -150 Vdc		Ihk Ihk	--- ---	150 150	µAdc µAdc

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection	Method	Conditions	Symbol	Limits		Unit
				min	max	
Conformance inspection, part 2 -continued						
RF useful power output 8/	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	225	---	W
Conformance inspection, part 3						
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 Ihk	--- ---	150 150	µA dc µA dc
Pulse emission 6/	2212	Eb = Ec_2 = 250 Vdc; Ec_1 = -100 V dc; egk/ik = 1.5 a; Ef = 6.0 V ac; prr = 11 ±1.0; tp = 4,500 µs (min)	Δik	---	100	mA
RF useful power output 8/	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 9/	1366	E = 100 Vdc: g_1 negative E = 500 Vdc: g_1 negative g_2 positive g_2 negative	Rg_1k Rg_1g_2 Rg_2k Rg_2p	10 10 10 10	--- --- --- ---	Meg Meg Meg Meg

See footnotes at end of table

TABLE I. Group A inspection - Continued.

Inspection	Method	Conditions	Symbol	Limits		Unit
				min	max	
Conformance inspection, part 3 -continued						
Life test (3)	---	RF useful output; airflow = 1.5 cfm	t	100	---	hrs
Life-test (3) end points:	---					
RF useful power output 8/	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 10/	1011	14 days duration; Ic_1 = -20 μA dc (max) under post test conditions	---	---	---	---
Forced cooling 4/	1143	Ec_1/Ib = 250 mAdc	T(anode core)	---	225	°C
Coolant-pressure drop versus coolant flow (forced air) 5/	1155	No voltages	---	---	0.35	Inch H_2O

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:

F (MHz)	Ef (V ac)
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 13/) 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.

3/ The socket shown on Drawing 246-JAN 13/ 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 μs 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 13/.

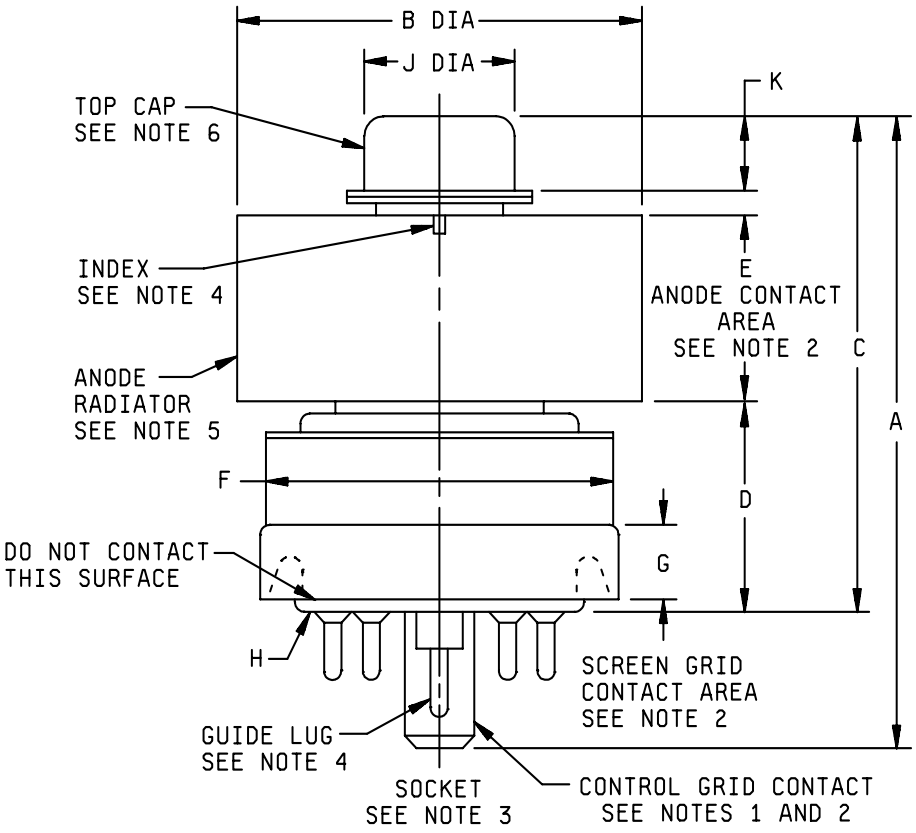
9/ This test shall be made 30 minutes after Ef is turned off. Rated airflow shall be maintained during this 30 minute interval. Measurement with General Radio Megometer Model No. 1862C, or equivalent. Unused elements are to be left floating.

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.

11/ Revision letters are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

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

13/ Contact preparing activity with questions on availability of “JAN” drawings: DSCC-VAT, Defense Supply Center Columbus, P.O. Box 3990



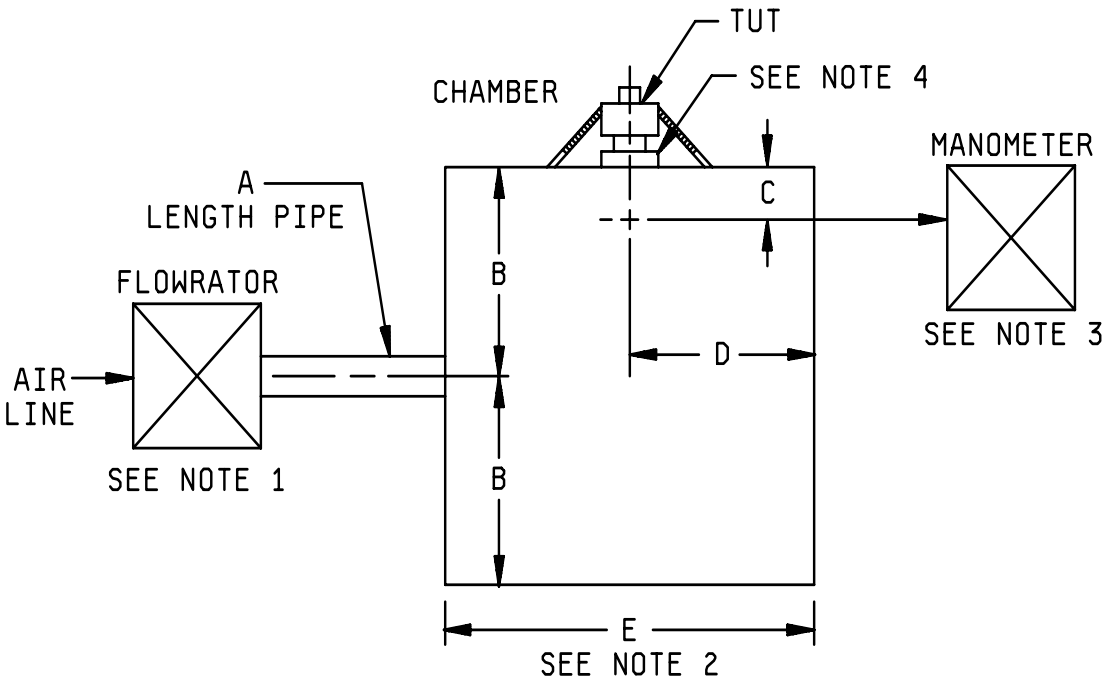
PIN CONNECTIONS	
PIN NO.	ELEMENT
1	g_2
2	k
3	h
4	k
5	INT CON
6	k
7	h
8	k
CENTER POST	g_1
RADIATOR & CAP	a
BASE RING	g_2

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

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 13/ 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 13/. Conformance inspection, part 2, shall apply.
3. Air-system socket shall be as specified on Drawing 246-JAN 13/, 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.

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

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

Preparing activity:
DLA -CC

(Project 5960-3622)

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I RECOMMEND A CHANGE:	**1. DOCUMENT NUMBER** MIL-PRF-1/889H	**2. DOCUMENT DATE (YYMMDD)** 021120

3. DOCUMENT TITLE
ELECTRON TUBE, POWER, TYPES 7203 AND 7203A

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME DSCC-VAT	b. TELEPHONE (Include Area Code) (1) Commercial (614)692-0506 (2) AUTOVON 850-0506
c. ADDRESS (Include Zip Code) Defense Supply Center Columbus Attn: DSCC-VAT P. O. Box 3990 COLUMBUS, OHIO 43216-5000	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340

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