

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, POWER
 TYPES 8161 AND 8251

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: Triodes, ceramic, metal.
 See figures 1 and 2.
 Mounting position: Vertical, base down or up.
 Weight: 8161: 6.25 pounds nominal.
 8251: 7.5 pounds nominal.

ABSOLUTE RATINGS: C telegraphy

Type 8161:

Parameter:	F1	Ef	Eb	Ec	Ib	Pg	Pp	Pi	Anode core and seal T °C	Cooling
Unit:	MHz	V ac	kV dc	kV dc	A dc	W	kW	kW		
Maximum	110	7.9	4.0	-1.0	2.0	150	4.0	7.2	250	---
Minimum	---	7.1	---	---	---	---	---	---	---	---
Test conditions:	---	7.5	3.0	Adj.	0.83	---	---	---	---	1/

ABSOLUTE RATINGS: C telegraphy

Type 8251:

Parameter:	F1	Ef	Eb	Ec	Ib	Pg	Pp	Pi	Anode core and seal T °C	Cooling
Unit:	MHz	V ac	kV dc	kV dc	A dc	W	kW	kW		
Maximum	30	7.9	4.0	-1.0	2.0	150	4.0	7.2	250	---
Minimum	---	7.1	---	---	---	---	---	---	---	---
Test conditions:	2/									

See footnotes at end of table I.

GENERAL:

Qualification - Required.

MIL-PRF-1/1619C

TABLE I. Testing and inspection.

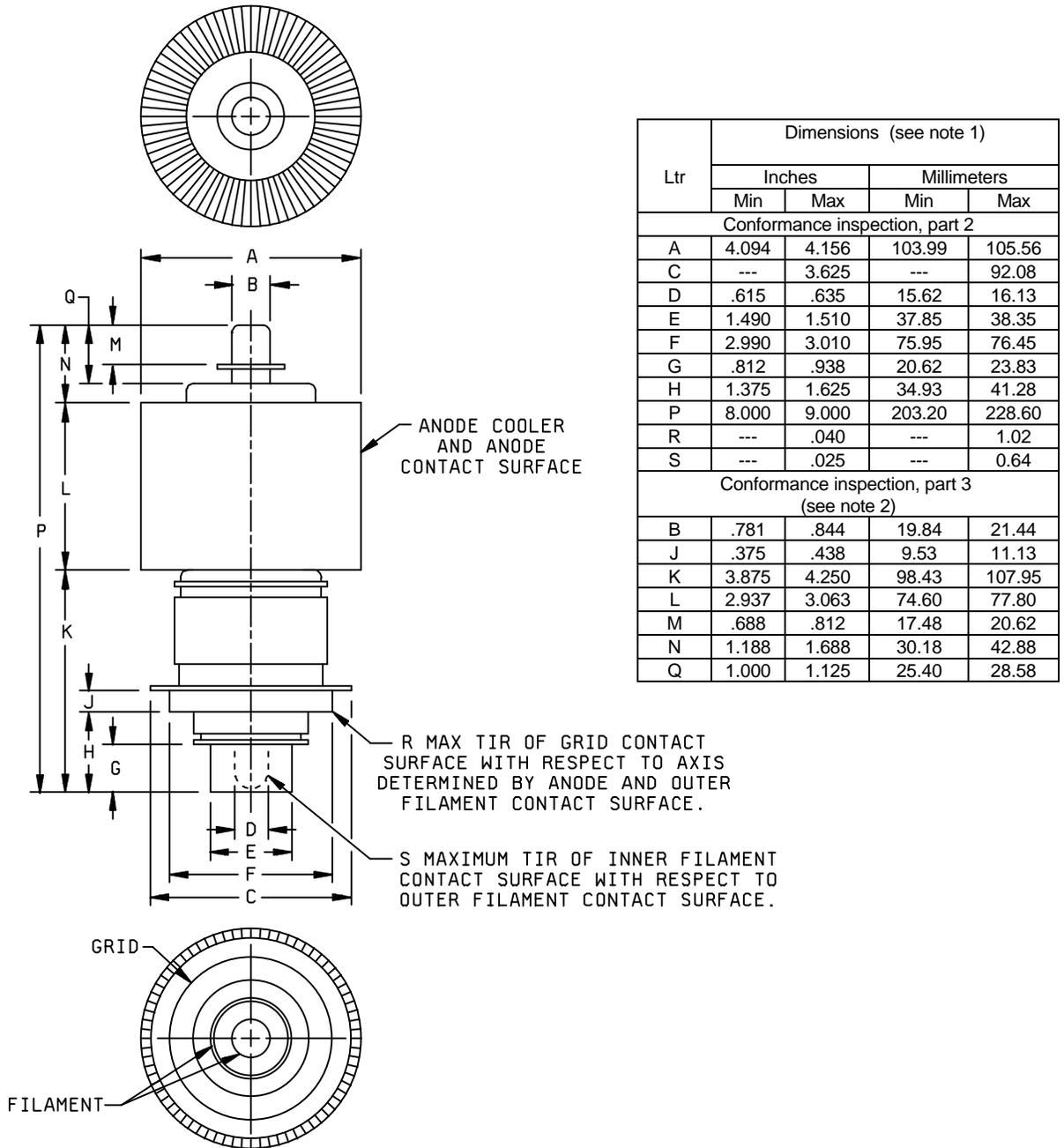
Inspection	Method	Conditions	Acceptance level	Inspection level or code	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 1</u>								
Filament current	1301		0.65	II	If	49	54	A ac
Peak emission	1231	eb = ec = 2,500 v	0.65	II	is	35	---	a
Electrode voltages (grid)	1261		0.65	II	Ec	-67	-100	V dc
Total grid current	1266	5/	0.65	II	Ic	---	-50	μA dc
Primary grid emission	1266	Ef = 8.3 V ac; t = 15 sec; Ic = 0.9 A dc; anode grounded	0.65	II	Isg	---	-250	μA dc
<u>Conformance inspection, part 2</u>								
Amplification factor	1316A		---	---	Mu	19	26	---
Direct interelectrode capacitance	1331		---	---	Cgp Cin Cout	16.8 29.2 0.60	23.2 40.2 1.20	pF pF pF
Power oscillation	1236	Eb = 4,000 V dc; Ib = 1.8 A dc; F = 110 MHz; Rg = 2,150 ohms	---	---	Po	4.2	---	kW useful
<u>Conformance inspection, part 3</u>								
Life-test		Group C; power oscillation; t = 500 hours	---	---	---	---	---	---
Life-test end points:								
Peak emission	1231		---	---	is	28	---	a
Primary grid emission	1266		---	---	Isg	---	-250	μA dc
Forced cooling	1143	Pp = 4.0 kW 3/ 6/	---	---	T anode core	---	250	°C
					T fil seal	---	250	°C
Pressure drop	---	Cooling 4/ 6/	---	---	Pres- sure	---	1.4	In.H ₂ O

See footnotes on top of next page.

TABLE I. Testing and inspection - Continued.

- 1/ In all electrical tests involving application of filament voltage, forced-air cooling is allowable as follows: base-to-anode airflow, 67 cfm maximum; anode-to-base airflow, 84 cfm maximum through the anode cooler, plus 3 cfm maximum directed into the filament stem structure. These figures apply for air at 40°C maximum and at sea level. At higher air temperature or altitude, suitable correction of the airflow is allowable. Cooling air should be supplied before or simultaneously with application of electrode voltages (including the filament) and may be removed simultaneously with them.
- 2/ The 8251 type may be made by attaching the base flying leads to an 8161 which has met all the requirements listed herein. After attachment of the flying leads and any other mechanical processing, including plating, the 8251 shall meet the requirements of the holding period and the total grid current test.
- 3/ For the cooling test, the tube shall be mounted in an infinite baffle system, or equivalent, so that all air passing in a base-to-anode direction shall pass through the anode cooler of the tube. With cooling air of not less than 20°C nor more than 40°C, both base and anode shall be cooled by applying an airflow of 67 cfm maximum at sea level. At altitudes above sea level, the equivalent mass flow may be used. An appropriate value of anode voltage and current shall be used to produce the specified anode dissipation. Temperatures shall be measured by means of thermocouples, located as follows:
 - Anode core: The thermocouple shall be embedded in the base of the anode core, at the base of the cooling fins, by means of 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.
 - Filament seal: The thermocouple shall be attached using a suitable cement to either the inner or the outer filament conductor and as close as possible to where the two conductors join the stem dielectric material.

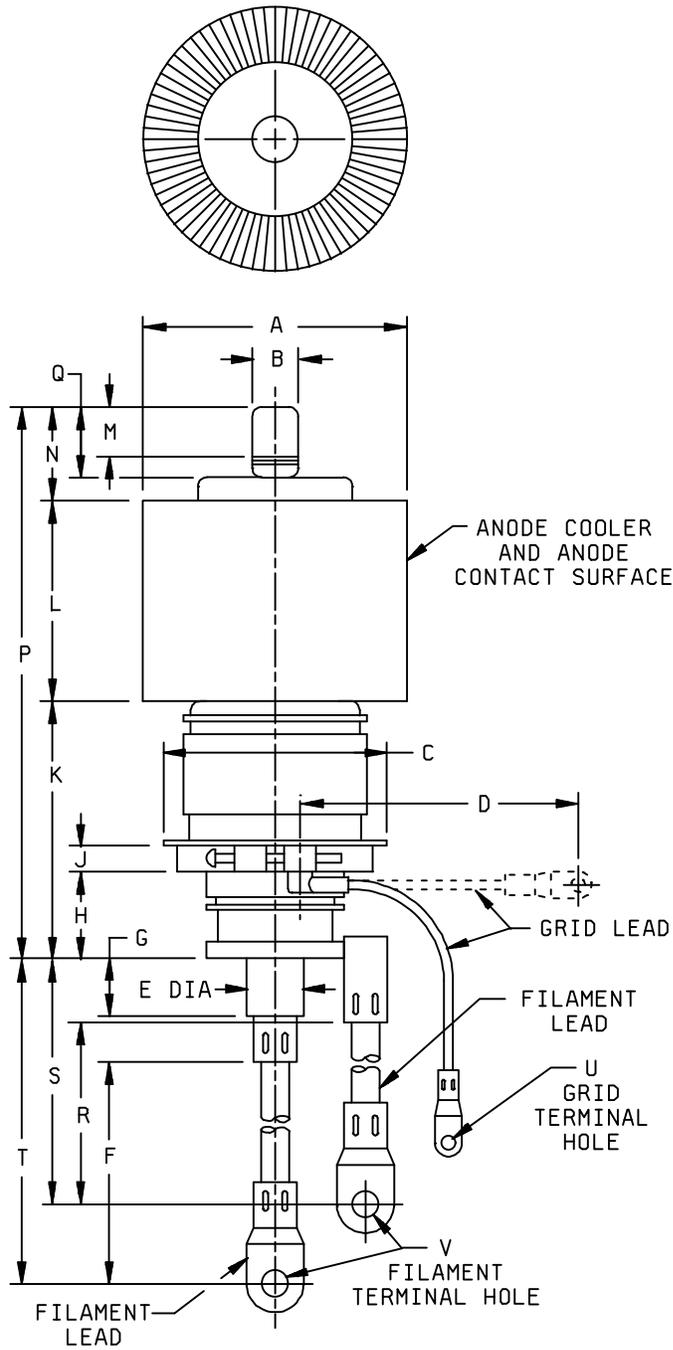
Good electrical continuity between the thermocouple and the metal surface to which it is attached shall be demonstrated before the cooling test is performed. The size and material of the thermocouples, their installation, and the measuring instrument used to determine temperature shall be in accordance with good engineering practice.
- 4/ The pressure drop across the anode cooler shall be measured while the tube is operating as specified during the cooling test. If test is performed at altitudes significantly above sea level and the airflow is adjusted for an equivalent mass-flow rate, the allowable pressure drop may also be recomputed on the same basis.
- 5/ This test to be performed first at the conclusion of the holding period.
- 6/ This test shall be performed during the initial production and once each succeeding 12-calendar months in which there is production. A regular double sampling plan shall be used, with the first sample of three tubes with an acceptance number of zero, and a second sample of three tubes with a combined acceptance number of one. In the event of failure, the test shall be made as a part of conformance inspection, part 2, code level D, with an acceptance level of 6.5. The regular "12-calendar months" double sampling plan shall be reinstated after three consecutive samples have been accepted.
- 7/ Reclaimed materials shall be utilized to the maximum extent possible.



NOTES:

1. Metric equivalents (to the nearest 0.01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
2. See 6/

FIGURE 1. Outline drawing of electron tube type 8161



Ltr	Dimensions (see note 1)			
	Inches		Millimeters	
	Min	Max	Min	Max
Conformance inspection, part 2				
A	4.094	4.156	103.99	105.56
C	---	3.625	---	92.08
D	6.375	6.625	161.93	168.28
G	.812	.937	20.62	23.82
H	1.375	1.625	34.93	41.28
P	8.000	9.000	203.20	228.60
S	7.937	8.437	201.60	214.30
T	8.937	9.437	237.00	239.70
U	.194	.200	4.93	5.08
V	.385	.395	9.78	10.03
Conformance inspection, part 3 (see note 2)				
B	.781	.844	19.84	21.44
E	.859	.890	21.82	22.61
F	7.000	7.500	177.80	190.50
J	.375	.438	9.53	11.13
K	3.875	4.250	98.43	107.95
L	2.937	3.063	74.60	77.80
M	.688	.812	17.48	20.62
N	1.188	1.688	30.18	42.88
Q	1.000	1.125	25.40	28.58
R	7.000	7.500	177.80	190.50

NOTES:

1. Metric equivalents (to the nearest 0.01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
2. See 6/.

FIGURE 1. Outline drawing of electron tube type 8251.

Custodians:

Army - CR
Navy - EC
Air Force - 85

Review activities:

Army - AR
Navy - AS, CG, MC, SH
Air Force - 11, 19, 99

Preparing activity:
DLA - CC

(Project 5960-3496)