MILITARY SPECIFICATION SHEET

ELECTRON TUBE, TRAVELING WAVE

TYPE 8882

This specification is approved for use by the Engineering and Technical Support Division (AFLC/LOIE), Department of the Air Force, and is available for use by all Departments and Agencies of the Department of Defense.

The complete requirements for procuring the electron tube described herein shall consist of this document and the latest issue of Specification MIL-E-1.

DESCRIPTION: O-Type, medium power, integral periodic permanent magnet, convection-cooled.

ABSOLUTE RATINGS:

Parameter:	E_f	I_f	E_c	I_c	E_w	I_w	Pin
Unit:	V	A	Vdc	mAdc	mAdc	mAdc	W
Maximum:	7.0	0.5	100	.1	1150	5	10
Minimum:	6.0	0.0	-100	0	0	0	0

PHYSICAL CHARACTERISTICS:

Dimensions: See outline drawing
Weight: 4.50 pounds approximately
Mounting Position: Any
Cathode: Unipotential

Test Frequencies Tolerance ±0.1%
F_1 = 7.45 GHz
F_2 = 9.20 GHz
F_3 =11.0 GHz

TEST CONDITIONS: See Note 12

Parameter:	E_f	I_f	E_c	I_c	E_w	I_w	I_k	T_k
Unit:	V	A	V	mAdc	Vdc	mAdc	mAdc	sec
Test 1:	6.3 ±5%	Set up from data on tube label and individual test data sheet, see Note 1						120
Test 2:	0	--	0	----	0	----	----	---

GENERAL:

First Article Inspection - Required (See Note 13)

METHOD	REQUIREMENT OR TEST	TEST	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
	First Article Inspection		See Note 13				
1011	Humidity	1	See Notes 3 and 10	---	---	---	---
1006	Salt spray	1,2	See Notes 6 and 10	---	---	---	---
----	Vibration	1	MIL-STD-202, Method 204 See Note 10	---	---	---	---
1042	Shock	-	15G, 11 ms See Note 10	---	---	---	---
	Quality conformance inspection, part 1						
1301	Heater current	-	E_f = 6.3 V	I_f	---	.5	A
----	Helix voltage	1		Ew	1150	1200	V
4250	Small signal gain	1	F = F_1-F_3 $P_i \simeq$ -40 dbm	Gss	36	---	db
4253	Gain variation	1	F = F_1-F_3 $P_i \simeq$ -40 dbm	ΔGss	---	5	db
4253	Gain variation (fine gain)	1	F = F_1-F_3 $P_i \simeq$ -40 dbm See Note 4	ΔGss	---	±1.5	db
----	Gain slope, small signal	1	F = F_1-F_3 $P_i \simeq$ -40 dbm See Note 4	$\frac{\Delta Gss}{\Delta F}$	---	.1	$\frac{db}{MHz}$
4260	Noise figure	1	F = F_1-F_3	NF	---	20	db
----	Gain control element	1	F = F_2 P_i = 0 dbm See Note 5	ΔGss	60	---	db
4251	Output power	1	F = F_1-F_3	Po	10	---	dbm
4256	Input and output match (hot)	1	F_1 to F_3 continuously variable frequency	VSWR	---	1.5:1	---
	Quality conformance inspection, part 2						
D-30(b)	Dimensions	-	See Figure 1	---	---	---	---
----	Magnetic field	2	See Note 7	H	---	5	Gauss
----	Temperature	1	See Notes 2 and 10	---	---	---	---
----	Altitude	1	See Notes 7 and 10	---	---	---	---
----	Temperature altitude	-	See Notes 8 and 10	----	---	---	---

METHOD	REQUIREMENT OR TEST	TEST	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
	Quality conformance inspection, part 3						
----	Life test	-	Group D	t	1000	---	hrs
----	Life test end points:						
4251	Output power	1	$F = F_1-F_3$	Po	10	---	dbm
4250	Small signal gain	1	$F = F_1-F_3$ $P_i \approx -40$ dbm	Gss	36	---	db
4260	Noise figure	1	$F = F_1-F_3$	NF	---	20	db

NOTES:

1. A copy of the critical performance characteristics including operating voltages shall be shipped with each tube. The operating voltages shall also be clearly indicated on the tube label and on a small decal at the collector end of each tube. Each tube delivered on the contract shall operate optimally under a single combination of discreet voltages which shall fall within the ranges shown under Absolute Ratings herein. All operating requirements of this specification sheet shall be met under these specific voltages.

2. The tube under test shall perform as specified herein with relative humidity uncontrolled at ambient temperatures from -51°C to 65°C.

3. The tube under test shall perform as specified herein at relative humidity varying from 5 to 100 percent, including condensation at any temperature up to 50°C (122°F).

4. Fluctuation in gain versus frequency shall not exceed $\pm$1.5 db with a maximum slope of .1 db per MHz.

5. The TWT shall contain a voltage controlled element which shall have the capability of continuously controlling the small signal gain by a range of at least 60 db. The grid voltage necessary for normal TWT operation shall be between 0 and 100 volts with respect to cathode in order to reduce small signal gain by 60 db from its normal operating value. It shall not be necessary to apply grid voltages more negative than -10 volts.

6. The tube under test shall withstand, in both the operating and nonoperating condition, exposure to salt-sea atmosphere.

7. The magnetic field shall not exceed 5 Gauss at a distance of 1 inch from the tube helix. The field may be 5 Gauss one (1) inch from case at the cathode end of the tube and extending toward the collector 1.5 inches.

8. The tube under test shall operate at an environment temperature not less than 10°C or greater than 15°C at a simulated altitude of 60,000 feet. From a predetermined hot spot measurement test at room ambient conditions, the hottest spot on the tube shall not exceed 213°C during the temperature altitude test.

9. The tube shall be operated at least four hours at 60,000 feet altitude conditions at maximum helix voltage. No arcing shall occur.

10. During (or after) performance of the specified test the tube shall satisfy the requirements of Methods 4250, 4251, and 4260 as specified herein.

11. If these tests have been performed within the past 24 months, and unless the material, manufacturing process, or test requirements have changed in the interim, these tests need not be performed.

NOTES: -Continued

12. The tube under test shall be operated with the cathode at ground potential.

13. First article sample inspection shall conform to the requirements of appendix F of MIL-E-1 and shall consist of performing all tests specified on this tube specification sheet. In addition, first article sample approval shall include satisfactory demonstration of the tube-to-system compatibility. Invitation for bids should provide that the preparing activity reserves the right to waive the requirements for first article samples as to those bidders offering a product which has been previously procured or tested by the Government, and that bidders offering such products who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending procurement.

Custodian:

Air Force - 85

Review activity:

Air Force - 99

User activity:

Air Force - 11

Preparing activity:

Air Force - 85

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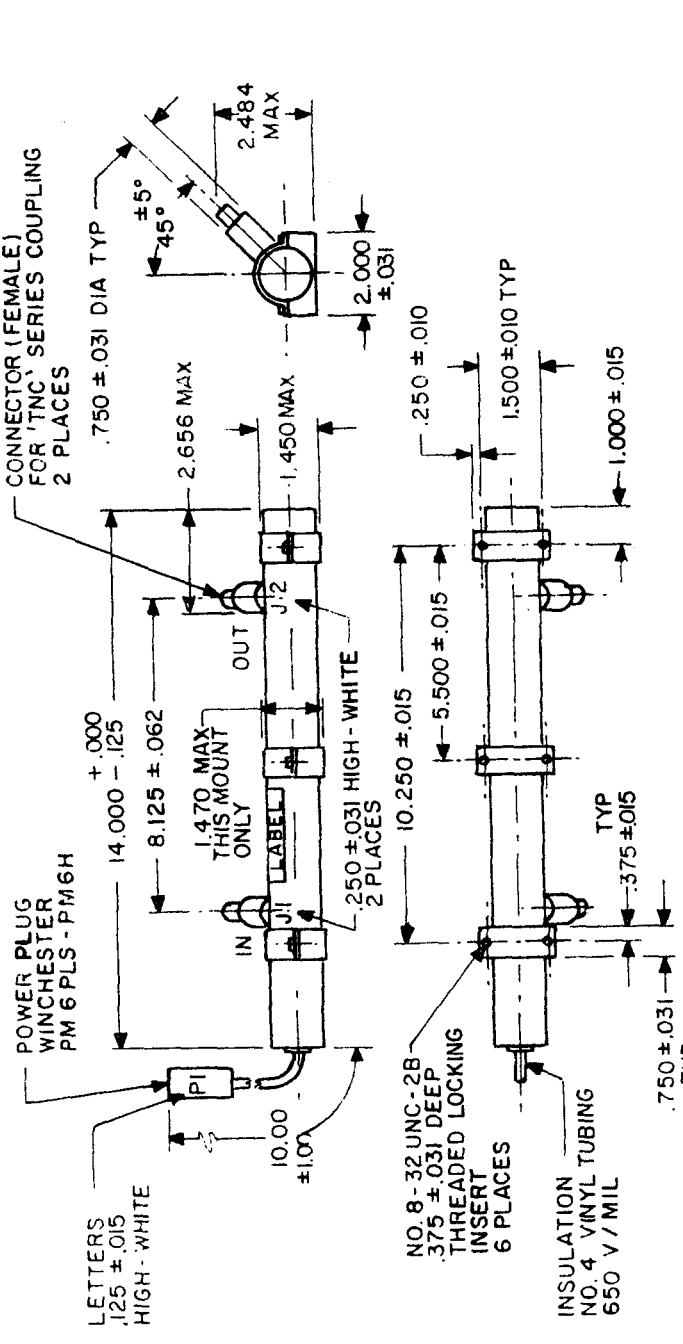

INCHES	MM
.005	.13
.010	.25
.015	.38
.031	.79
.062	1.57
.125	3.18
.250	6.35
.375	9.53
.750	19.05
1.000	25.40
1.450	36.83

INCHES	MM
1.470	37.34
1.500	38.10
2.000	50.80
2.484	63.09
2.656	67.46
5.500	139.70
8.125	206.38
10.000	254.00
10.250	260.35
14.000	355.60

NOTES:
1. DIMENSIONS IN INCHES
2. METRIC EQUIVALENTS (TO THE NEAREST .01 MM) ARE GIVEN FOR GENERAL INFORMATION ONLY AND ARE BASED UPON 1 INCH = 25.4 MM

POWER PLUG CONNECTIONS

A	HEATER
B	HEATER-CATHODE
C	ANODE
D	CAPSULE GROUND
E	N.C.
F	HELIX-COLLECTOR

FIGURE 1 Outline drawing for tube Type 8882