MILITARY SPECIFICATION SHEET

ELECTRON TUBE, KLYSTRON

TYPE 5836

This specification is approved 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: Reflex oscillator, separate cavity, pulse and cw operation, glass-metal construction.

ABSOLUTE RATINGS:

Parameter:	Ef	Ec1	Ec2	Ec3	Er	Ik	Ehk	Pi	tk	Alt
Unit:	V	Vdc	Vdc	Vdc	Vdc	mAdc	Vdc	W	sec	ft
Maximum:	6.9	+20, -150	350	350	-700	30	±45	12	---	10,000
Minimum:	5.7	---	---	---	0	--	---	--	120	

PHYSICAL CHARACTERISTICS:

Dimensions:	See Figure 1
Cathode:	Unipotential
Mounting position:	Any
Base:	Small 4-pin See Figure 1

TEST CONDITION:

Parameter	Ef	Ers	Er	Ec1	Ec2	Ec3
Unit:	V	Vdc	Vdc	Vdc	Vdc	Vdc
Test:	6.3	0	Adj.	+10	300	300

REQUIREMENT OR TEST:

GENERAL

Qualification - Required

5836

FSC 5960

METHOD	REQUIREMENT OR TEST	NOTES	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
	Qualification						
----	Jitter (1)	2 5	egy = 18 to 22 V; Ec1 = -10 Vdc; Prr = 1,000 tp = 1.0 μs	Tj	---	0.2	μs
	Quality conformance inspection, part 1						
4229	Total reflector current	4	Ers = 90 Vdc	Ir	---	2.0	μAdc
1301	Heater current		Ef = 6.3 V	If	600	750	mA
4250	Power output (1)	5		Po	25	---	mW
1256	Cathode current (1)	5		Ik	12	30	mAdc
4213	Reflector voltage (1)	5		Er	-25	-55	Vdc
4218	Fixed-tuned frequency (1)	5		F	2110	2170	MHz
4206	Emission oscillation		Ef = 5.7 V	$\Delta \frac{Po}{Po}$	---	15	%
4250	Power output (2)	6		Po	25	---	mW
4213	Reflector voltage (2)	6		Er	-240	-320	Vdc
4218	Fixed-tuned frequency (2)	6		F	4225	4355	MHz
1266	Total grid current (2)	6		Ic1	0	7	mAdc
----	Leakage		Ec1 = -90 Vdc; Ef = 6.3 V; no other voltages	Ic1-k	---	60	μAdc
----	Cutoff current		Ec2 = Ec3 = 325 Vdc; Er = 0 V; Ec1 = -10 Vdc	Ihk	---	100	μAdc
	Quality conformance inspection, part 2						
1101	Secureness of base, base insert, and cap	7		--	---	---	---
1031	Low-frequency vibration		No voltages	--	---	---	---
4229	Total reflector current (1)	1 5		Ir	---	50	Adc
1336	Heater-cathode leakage		Ehk = 45 Vdc	Ihk	---	75	Adc
4201	Electronic tuning range	1 5		ΔF	6	---	MHz
----	Jitter (2)	2 6	egy = 18 to 22 V; Ec1 = -10 Vdc; Prr = 1,000; tp = 1.0 μs	Tj	---	0.2	μs

METHOD	REQUIREMENT OR TEST	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
	Quality conformance inspection, part 2					
----	Life-test provisions	Group C; See note 3	t	500	---	hr
----	Life-test end points:					
4250	Power output (1)	Ec2 = Ec3 = 300 Vdc; Ec1 = 10 Vdc; See note 5	Po	20	---	mW
4250	Power output (2)	Ec2 = Ec3 = 300 Vdc; Ec1 = 10 Vdc; See note 6	Po	20	---	mW

NOTES:

1. Vary Er for half-power point each side of maximum. Read frequency at the half-power points.

2. The pulse input shall be between 18 and 22 volts and shall be square. Jitter is the time interval of the output pulse during which the tube exhibits erratic starting.

3. Tube shall be tested with 3,000 MHz test cavity as specified on Drawing 166-JAN, or equivalent. Frequency approximately 3,000 MHz. Tube operated in N = 2 mode (2-3/4 cycles for complete transit). Adjust Er for maximum power output. Adjust output coupling loop for maximum power output.

4. Static test; tube not oscillating.

5. Tube shall be tested with 2,140 MHz test cavity as specified on Drawing 166-JAN, or equivalent. Adjust cavity to resonate at 2,195 MHz with standard plug as specified on Drawing 197-JAN. Tube operated in N = 2 mode (2-3/4 cycles for complete transit). Adjust Er for maximum power output. Adjust output coupling loop for maximum power output.

6. Tube shall be tested with 4,290 MHz test cavity as specified on Drawing 166-JAN, or equivalent. Adjust cavity to resonate at 4,330 MHz with standard plug as specified on Drawing 197-JAN. Tube operated in N = 2 mode (2-3/4 cycles for complete transit). Adjust Er for maximum power output. Adjust output coupling loop for maximum power output.

7. Water-immersion test omitted. Torque shall be applied between upper disk (g3) and molded portion of base.

Custodians:
Army - EL
Navy - EC
Air Force - 85

Review activities:
Army - EL
Navy - EC
Air Force - 80
DSA - ES

User activities:
Army - MU
Navy - WP, MC, CG
Air Force - 11

Preparing activity:
Air Force - 85

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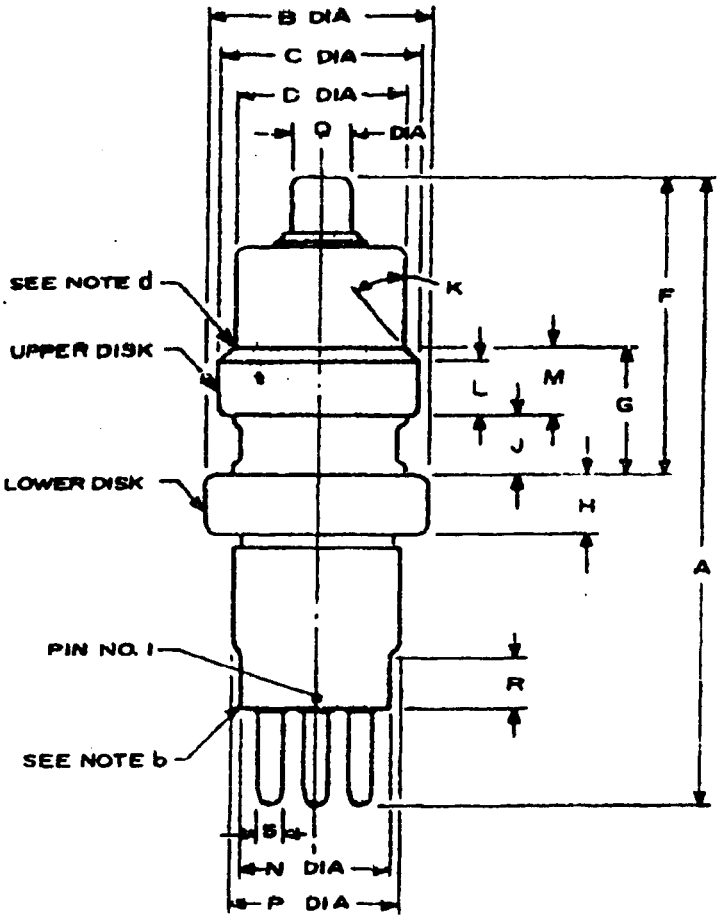

DIMENSIONS				
LTR	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
QUALIFICATION				
D		.750		19.05
N	.635	.660	16.13	16.76
P		.750		19.05
Q	.245	.255	6.22	6.48
K	25°	30°		
QUALITY CONFORMANCE INSPECTION, PART 1				
A	2.969	3.219	75.41	81.76
B	.990	1.000	25.15	25.40
C	.880	.890	22.35	22.61
F	1.375	1.500	34.93	38.10
M	.303	.323	7.70	8.20
QUALITY CONFORMANCE INSPECTION, PART 2				
G	.553	.593	14.05	15.06
H	.250	.312	6.35	7.92
J	.250	.270	6.35	6.86
L	.250		.635	
R	.250	.312	6.35	7.92
S	.091	.095	2.31	2.41

PIN CONNECTIONS	
PIN NO.	ELEMENT
1	g1
2	h
3	k
4	h
LOWER DISK	g2
UPPER DISK	g3
CAP	

NOTES:

a. METRIC EQUIVALENTS (TO THE NEAREST .01 mm) ARE GIVEN FOR GENERAL INFORMATION ONLY AND ARE BASED UPON 1 INCH = 25.4 mm.

b. SHELL FORMED FROM ELECTRICAL GRADE NICKEL. PINS MOLDED IN PHENOLIC. PIN GAGE JEDEC GA4-5.

c. THE AQL FOR THE COMBINED MECHANICAL DEFECTIVES IN QUALITY CONFORMANCE INSPECTION, PART 1, SHALL BE 1.0 PERCENT, INSPECTION LEVEL I.

d. SPACE BETWEEN GLASS AND UPPER DISK OR BACKING RING SHALL BE .030 (.76 mm) INCHES MAXIMUM. QUALITY CONFORMANCE INSPECTION, PART 2 SHALL APPLY.

e. DIAMETERS 'B' AND 'C' SHALL BE CONCENTRIC WITHIN .025 (.64 mm) INCHES TIR AND SHALL FORM A CIRCULAR CYLINDER WITHIN A RANGE OF .006 (.15 mm) INCHES. ALLOWABLE RADIUS AT ENDS OF CYLINDER SHALL BE .030 (.76 mm) INCHES MAXIMUM. QUALITY CONFORMANCE INSPECTION, PART 2 SHALL APPLY.

f. TUBE SHALL BE TESTED IN CONCENTRICITY GAGE SPECIFIED ON DRAWING 199 JAN. GAGE READINGS OF DIAMETERS SHALL BE AS FOLLOWS:

DIAMETER	MAXIMUM ECCENTRICITY
D	.050 INCHES (1.27 mm)
N	.060 INCHES (1.52 mm)
P	.060 INCHES (1.52 mm)
Q	.040 INCHES (1.02 mm)

g. ALL CONCENTRICITY MEASUREMENTS SHALL BE QUALITY CONFORMANCE INSPECTION PART 2

h. PIN NO. 1 SHALL BE IDENTIFIED BY AN INDEX MARK (COLORED DOT OR OTHER)

j. CAP C1-3

FIGURE 1. Outline drawing of type 5836