

55865657

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2 June 1970

MILITARY SPECIFICATION SHEET

ELECTRON TUBES, MAGNETRON

TYPES 5586 AND 5657

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

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

DESCRIPTION: Pulsed, tunable frequency range (type 5586) 2,700 to 2,900 MHz (Type 5657) 2,900 to 3,100 MHz, rated peak power output 800 kW, separate magnet, air cooled

ABSOLUTE RATINGS:

Parameter:	Ef	tk	tpc	Du	epy	ib	pi	Pi	T(anode)	Alt
Unit:	V	sec	μs	--	kv	a	kw	W	°C	ft
Maximum:	17.6	---	2.50	0.001	32.5	70	2,200	1,300	100	10,000
Minimum:	14.4	120	---	---	---	---	---	---	---	---

PHYSICAL CHARACTERISTICS:

Dimensions: See figure 1

Magnet: See note 3

TEST CONDITIONS:

Parameter:	Ef	tk	tpc	trv	Du	Ib	VSWR	H
Unit:	V	sec	μs	μs	----	mAdc	----	Gauss
Test 1:								
Maximum:	---	120	1.10	0.20	----	---	1.15	---
Minimum:	Note 4	---	0.90	0.10	0.0005	35	----	2,700
Test 2:								
Maximum:	---	120	2.20	0.20	---	---	1.15	---
Minimum:	Note 4	---	1.80	0.10	0.0006	35	----	2,700

Note 3

GENERAL:

Qualification - Required

TEST FREQUENCIES (MHz)		
F	Type 5586	Type 5657
1	2,700	2,900
2	2,800	3,000
3	2,900	3,100

5586, 5657

METHOD	REQUIREMENT OR TEST	TEST	CONDITIONS	SYMBOL	LIMITS		UNIT
					MINIMUM	MAXIMUM	
	<u>Qualification</u>						
4027	Temperature coefficient	1	F = F1, F2, and F3; T = 60° to 90°C	$\Delta F/\Delta T$	---	0.07	MHz/°C
1047	Low-temperature operation	1	tk = 180 (max); F = F2	---	---	----	---
1031	High-frequency vibration	--	No voltages	---	---	---	---
	<u>Quality conformance inspection, part 1</u>						
4003	Pressurizing	--	See Note 1 P=40 to 45 lb _f /in ²	---	---	---	---
4289	Heater current	--	Ef = 16.0 V; tk = 120 See Note 4	If	2.8	3.4	A
4250	Power output (1)	1	F = F1, F2, and F3; t = 300 sec (max)	Po	400	---	W
4250	Power output (2)	2	F = F1; t = 300 sec (max)	Po	400	---	W
4315	Stability	1,2	See Note 2	MP	---	1.0	t
4306	Pulse voltage	1	F = F1, F2, and F3 Type 5586 Type 5657	epy epy	27 27.5	32 32.5	kv kv
4223	Mechanical tuning	1	Type 5586 Lower limit Upper limit	F F	--- 2,900	2,700 ---	MHz MHz
4223	Mechanical tuning range	1	Type 5657 Lower limit Upper limit	F F	--- 3,100	2,900 ---	MHz MHz
4308	RF bandwidth	1		BW	---	2.5/tpc	MHz
	<u>Quality conformance inspection, part 2</u>						
1031	Low-frequency vibration	--	No voltages	---	---	---	---
4310	Frequency pulling figure	1	Ib = 20 to 35 mA _{dc}	ΔF	---	15	MHz
1105	Permanence of marking	--		---	---	---	---
	<u>Quality conformance inspection, part 3</u>						
----	Life-test provisions	1	Group D	t	500	---	hrs
----	Life-test end points						
4250	Power output	1	F = F1, F2, and F3;	Po	320	---	W
4308	RF bandwidth	1		BW	---	2.5/tpc	MHz

NOTES:

1. Unless otherwise specified, the AQL for all tests listed under Quality conformance inspection, part 1, shall be 1.0 percent, with inspection level of II.
2. The missing pulses, MP, shall be counted during the last 3 minutes of a test interval not to exceed 6 minutes. A missing pulse is defined as a rf pulse whose average energy within a ± 1 percent frequency range of the normal operating frequency is 70 percent or less than that of the normal pulse.
3. The magnetic field should be calibrated in accordance with the following procedure:
 - (a) With a conventional 1/8-inch (3.18 mm) pole piece attached to the pole face of the magnet opposite the magnetron tuner as shown in figure 3.
 - (b) The magnetic field should then be adjusted for 2,700 gauss at the center of the gap.
 - (c) Remove the conventional 1/8-inch (3.18 mm) pole piece and replace it with the magnet with the distortion pole piece as shown on figure 3.
 - (d) Coil No. 400; pole tip 1.8 inch (45.72 mm) plus 0.005 (0.13 mm) minus 0.001 (0.03 mm).
4. During high-voltage operation, it is essential to operate the heater according to the following schedule 1/:

<u>Pi (Watts)</u>	<u>Ef (Volts)</u>
1,000 to 1,200	8.0
800 to 1,000	10.5
600 to 800	13.0
400 to 600	15.0
Less than 400	16.0

1/ The above schedule is valid only for repetition rates of 300 pps, or greater.

Custodians:

Army - EL
Navy - EC
Air Force - 85

Preparing activity:

Air Force - 85

Review activities:

Army - EL
Air Force - 99
DSA - ES

(Project No. 5960-3012)

User activities:

Army - WC
Navy - AS, OS, CG, SH
Air Force - 11

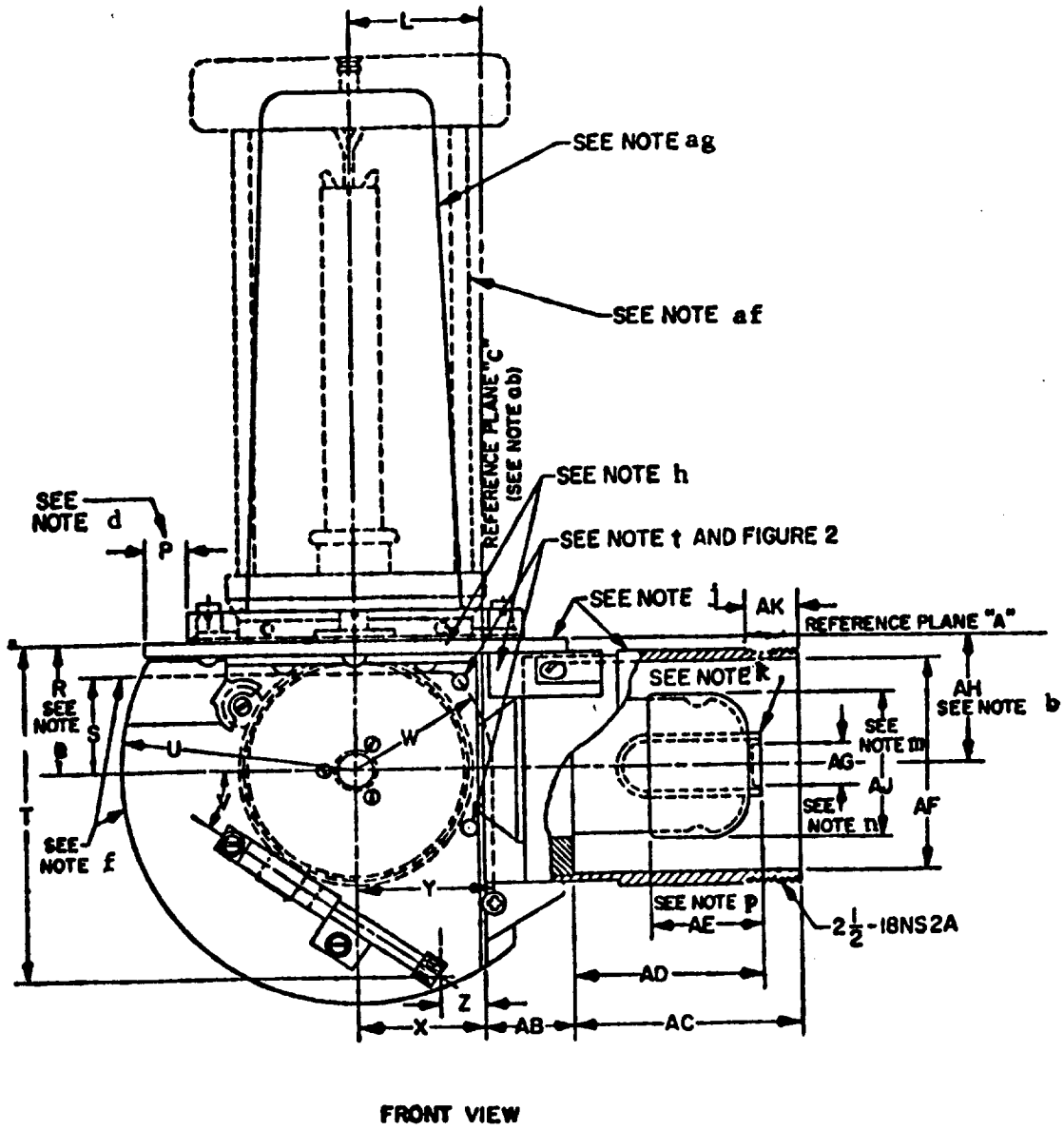


FIGURE 1. Outline drawing of electron tube types 5586 and 5657.

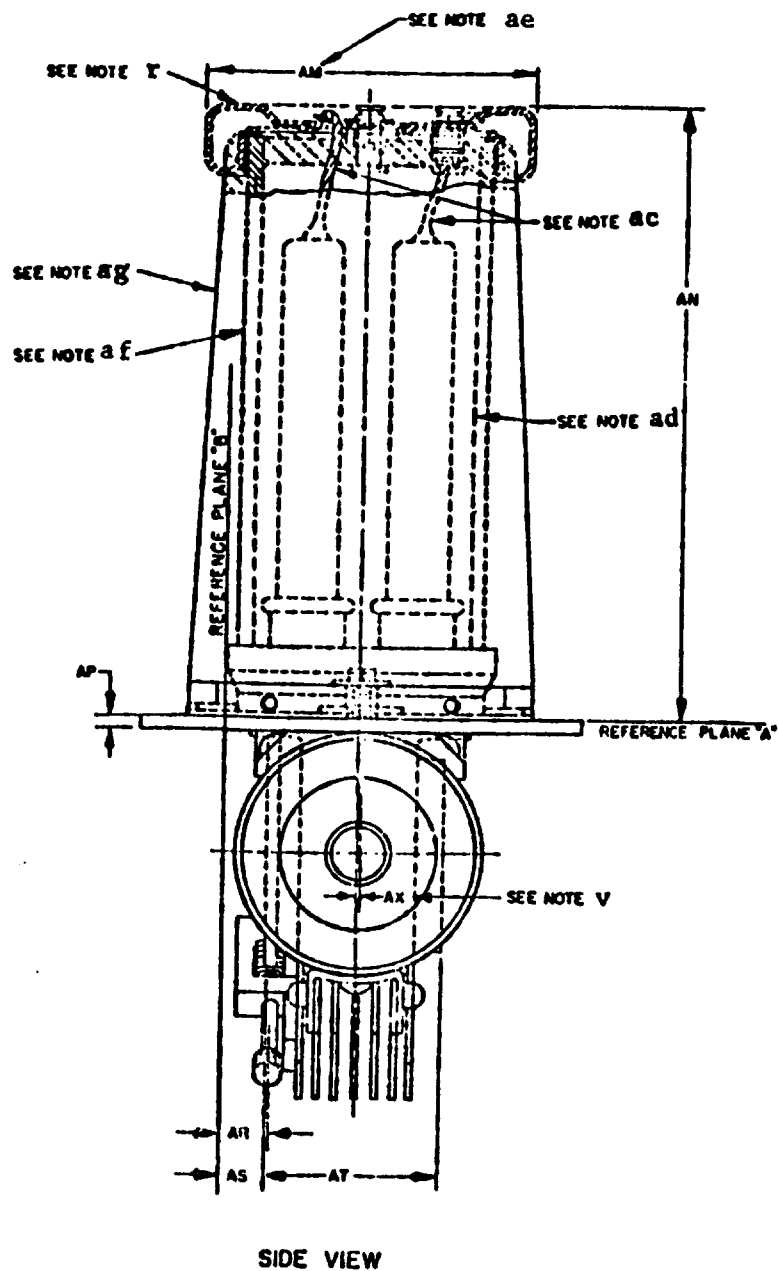


FIGURE 1. Outline drawing of electron tube types 5586 and 5657.
(Continued)

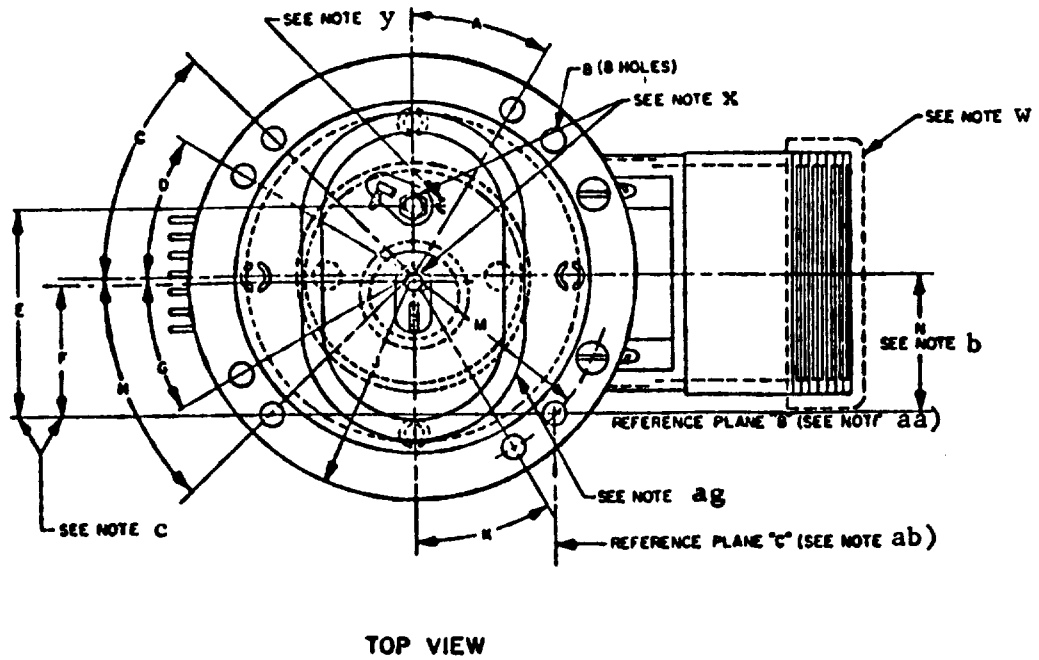


FIGURE 1. Outline drawing of electron tube types 5586 and 5657.
(Continued)

Ltr	Dimensions in inches with metric equivalents (mm) in parentheses	
	Minimum	Maximum
Quality conformance inspection, part 1 (see note a)		
N	1.417 (35.99)	1.457 (37.01)
AC	2.287 (58.09)	2.307 (58.60)
AD	2.060 (52.32)	2.110 (53.59)
AE	1.125 (28.58)	
AF	2.314 (58.78)	2.328 (59.13)
AG	.550 (13.97)	.560 (14.22)
AH	1.420 (36.07)	1.460 (37.08)
AJ		1.620 (41.15) DIA
AR	.438 (11.13)	.688 (17.48)
AS	.525 (13.34)	.625 (15.88)
AT		1.740 (44.20)
AU	11° 30'	16° 30'
Quality conformance inspection, part 2		
A	29° 48'	30° 12'
B	.205 (5.21) DIA	.215 (5.46) DIA
C	44° 48'	45° 12'
D	29° 48'	30° 12'
G	29° 48'	30° 12'
H	44° 48'	45° 12'
J	2.266 (57.56) RAD	2.296 (58.32) RAD
K	29° 48'	30° 12'
M	2.029 (51.54) RAD	2.035 (51.69) RAD
P	.500 (12.70)	
S	1.063 (27.00)	
U		2.656 (67.46) RAD
V	30°	35°
W	1.500 (38.10) RAD	
Y	1.500 (38.10)	
AB	.803 (20.40)	.833 (21.16)
AK	.593 (15.06)	
AM		3.531 (89.69)
AN	6.219 (157.96)	6.407 (162.74)

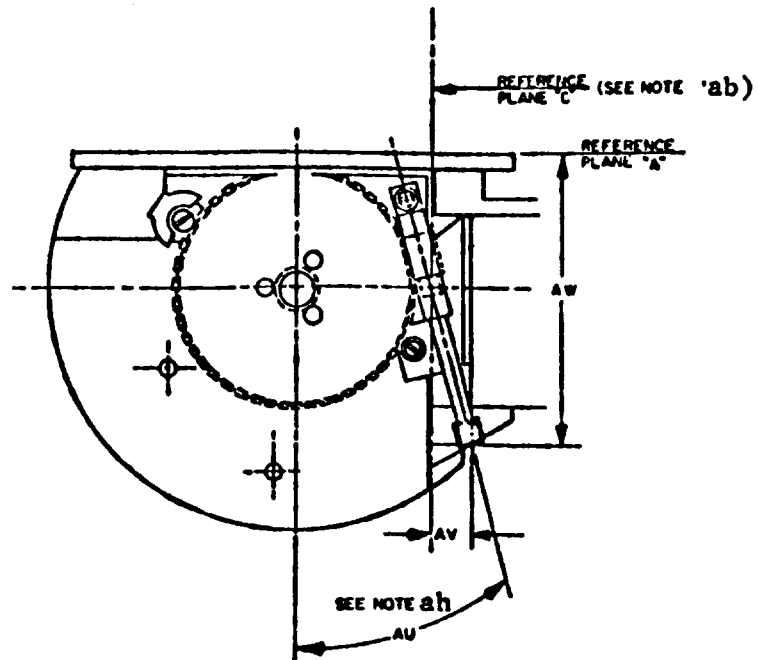
Ltr	Nominal dimensions
E	2.156 (54.76)
F	1.359 (34.52)
L	1.437 (36.50)
R	1.440 (36.58)
T	3.500 (88.90)
X	1.437 (36.50)
Z	.756 (19.20)
AZ	.187 (4.75)
AV	.313 (7.95)
AW	2.812 (71.42)
AX	.025 (.64)

FIGURE 1. Outline drawing of electron tube types 5586 and 5657.
(Continued)

NOTES:

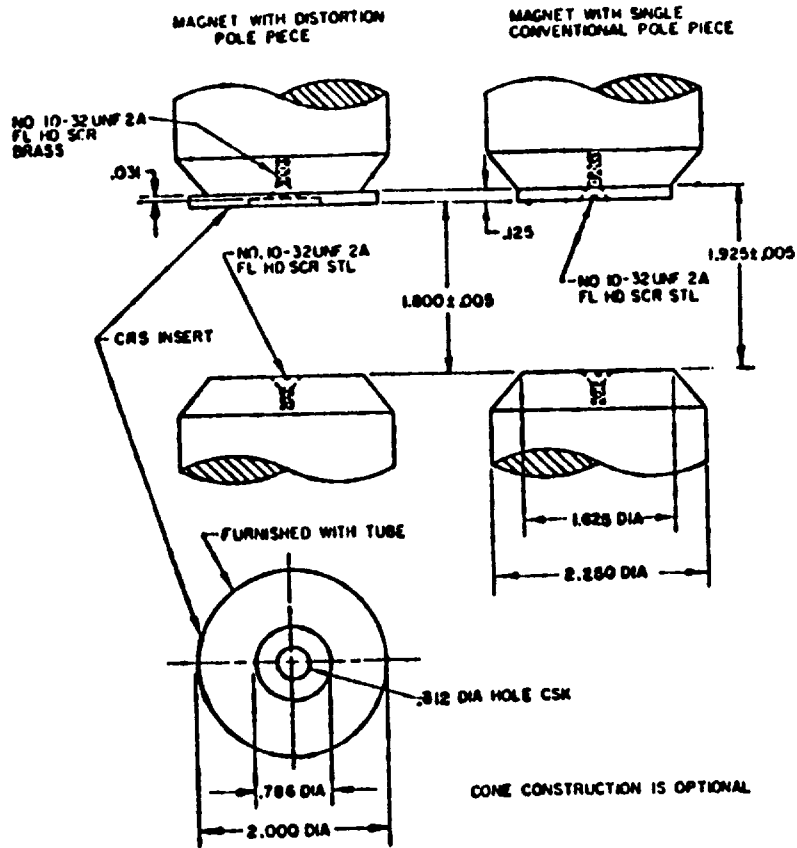
- a. Unless otherwise specified, the AQL for all tests listed under quality conformance inspection, part 1, shall be 1.0 percent, inspection level of II.
- b. Applies to location of center line of guard pipe only.
- c. The center of the jack holes shall be within a radius of .100 (2.54 mm) of the location specified, but shall be spaced .797 (20.24 mm) \pm .015 (.38 mm) with respect to each other.
- d. This annular area shall be flat within .015 (.38 mm) a thickness gage .125 (3.18 mm) wide shall not enter more than .250 (6.35 mm).
- e. The periphery of the anode shall lie within a 2.160 (54.86 mm) diameter circle located as specified for non-tunable side of anode.
- f. Maximum width specified applies to area defined by broken line and circumference of radiator.
- g. Paint with heat-resistant, non-corrosive paint. The following shall be free from paint; top surface of mounting plate, parts above mounting plate, screw threads on guard pipe, and all surfaces inside guard pipe, tuning gear, stop and worm shaft assembly.
- h. All solder joints on mounting plate and guard pipe shall be soldered to provide a hermetic seal.
- j. Tube may be supported by mounting plate or guard pipe.
- k. No sharp edges on outside diameter at end of inner conductor.
- m. Center line of maximum diameter shall be concentric with center line of guard pipe to within .040 (1.02 mm).
- n. Applies to inner conductor insert only. Center line of inner conductor insert shall be concentric with center line of guard pipe to within .025 (.64 mm).
- p. Applies to straight portion of inner conductor wall.
- r. Corona ring shall fall within a 3.662 (93.01 mm) diameter circle concentric to center of bolt hole circle. applicable to old type insulator only.
- t. Tuning mechanism will provide full range of tuning with five maximum complete revolutions of large tuning gear. Four complete revolutions for tube type 5657.
- u. Spline for adjusting tuning mechanism is as follows: 12 teeth, 48 pitch, .250 (6.35 mm) pitch diameter.
- v. This dimension shows relation between a plane passing through lateral center of anode and a plane through center of guard pipe.
- w. Protective guard for shipping purposes.
- x. Hex locking head, banana pin jack .594 (15.09 mm) long, and .169 (4.29 mm) \pm .005 (.13 mm) diameter.
- y. Common cathode connection marked with letter "C" at either top or side of base tube insulator.
- z. Reference plane "A" is defined as a plane passing along the face of the mounting plate.
- aa. Reference plane "B" is defined as a plane perpendicular to plane "A" and passing through the center of the holes as shown.
- ab. Reference plane "C" is defined as a plane mutually perpendicular to planes "A and B" and passing through the center of the hole as shown.
- ac. Leads shall be flexible and slack.
- ad. Pyrex glass or approved equal.
- ac. Applicable to old type insulator only.
- af. Old glass and metal type protector, shown only for information purposes.
- ag. One piece filament pipe protector.
- ah. Clearance to adapter guard pipe shall be sufficient to allow use of SS White No. 2666X or equal, end fitting (.406 (10.31 mm) diameter).

FIGURE 1. Outline drawing of electron tube types 5586 and 5657.
(Continued)

**NOTE:**

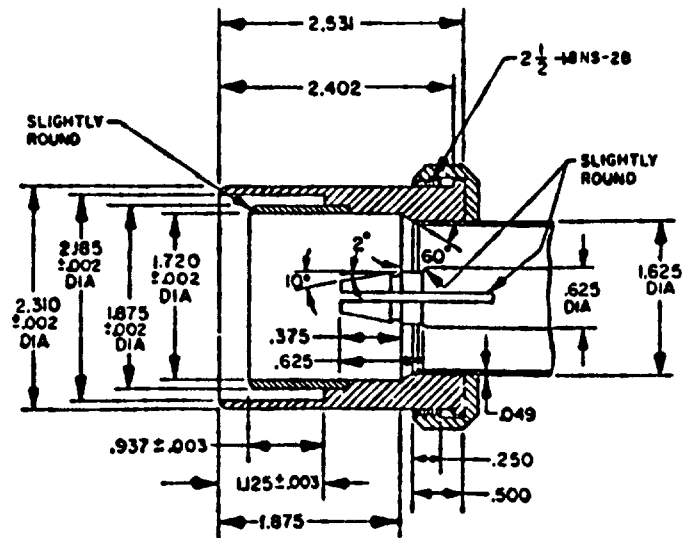
Tube to be supplied with spline located as specified by contractor.

FIGURE 2. Optional location of tuning spline.



INCHES	MM
.005	.13
.031	.79
.125	3.18
.312	7.92
.786	19.96
1.625	41.28
1.800	45.72
1.925	48.90
2.000	50.80
2.250	57.15

FIGURE 3. Magnetic field calibrators.



INCHES	MM	INCHES	MM
.002	.05	1.125	28.58
.003	.08	1.625	41.28
.049	1.24	1.720	43.69
.250	6.35	1.875	47.63
.375	9.53	2.185	55.50
.500	12.70	2.310	58.67
.625	15.88	2.402	61.01
.937	23.80	2.531	64.29

FIGURE 4. Test coupling (not furnished with tube).

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