

INCH POUND  
MIL-PRF-1/296D  
29 JUNE 1998  
SUPERSEDING  
MIL-E-1/296C  
12 May 1971

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE REFERENCE CAVITY  
TYPES 1Q22, 1Q23, 1Q24, 5846, 6040, 6041

The requirements for acquiring the electron tube described herein shall consist of this document and the latest issue of MIL-PRF-1.

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

DESCRIPTION: Reference cavity stabilizer, X-Band, Waveguide mounted.

ABSOLUTE RATINGS:

Resonant frequency (MHz)							
	1Q22	1Q23	1Q24	5846	6040	6041	Altitude
Minimum:	9249.5	9279.5	9309.5	9279.5	9307.5	9311.3	- - -
Maximum:	9250.5	9280.5	9310.5	9280.5	9308.5	9312.5	50,000 ft.

PHYSICAL CHARACTERISTICS:

Dimensions: See outline drawing.

Weight: 8 ounces (approximately).

Mounting Position: Any.

TEST CONDITIONS: See note 1.

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GENERAL:

Qualification: Required.

TABLE I. Testing and inspection.

Inspection	Method	Conditions	Symbols	Limits Min	Limits Max	Unit
<u>Conformance inspection, part 1</u>						
Insertion loss	---	At resonant frequencies	Li	4.0	6.0	dB
Loaded Q	---		QL	1,900	2,400	---
Temperature cycle (1)	---	T = 40°C to 100°C t = 30 minutes see note 3	1Q22Fo 1Q23Fo 1Q24Fo 5846Fo 6040Fo 6041Fo	9249.7 9279.7 9309.7 9279.7 9307.7 9311.7	9250.3 9280.3 9310.3 9280.3 9308.3 9312.3	MHz MHz MHz MHz MHz MHz
RF glow test	---	see note 5	---	---	---	---
<u>Conformance inspection, part 2</u>						
Vibration	1031	10 G see note 2	$\Delta F_o$	---	.15	MHz
Shock	1042B	50 G, 6 ms half-sine	$\Delta F_o$	---	.15	MHz
Temperature cycle (2)	---	T = 40°C to 100°C t = 12 hours see note 3	1Q22Fo 1Q23Fo 1Q24Fo 5846Fo 6040Fo 6041Fo	9249.7 9279.7 9309.7 9279.7 9307.7 9311.7	9250.3 9280.3 9310.3 9280.3 9308.3 9312.3	MHz MHz MHz MHz MHz MHz
Temperature compensation (1)	---	Room temperature to 100°C, see note 4	$\Delta F_o$	---	10.0	MHz
Off resonance insertion loss	---	F = 9,800 $\pm$ 100 MHz F = 8,850 $\pm$ 100 MHz	Li Li	30 30	---	dB dB
Pressurizing	4003	45 Psi absolute see note 8	---	---	---	---
<u>Conformance inspection, part 3</u>						
Life test	---	Group B, t = 30 minutes T = 55°C to 100°C see note 6	Cycles	25	---	---
Life test end points	---					

See footnotes at end of table I.

TABLE I. Testing and inspection - Continued.

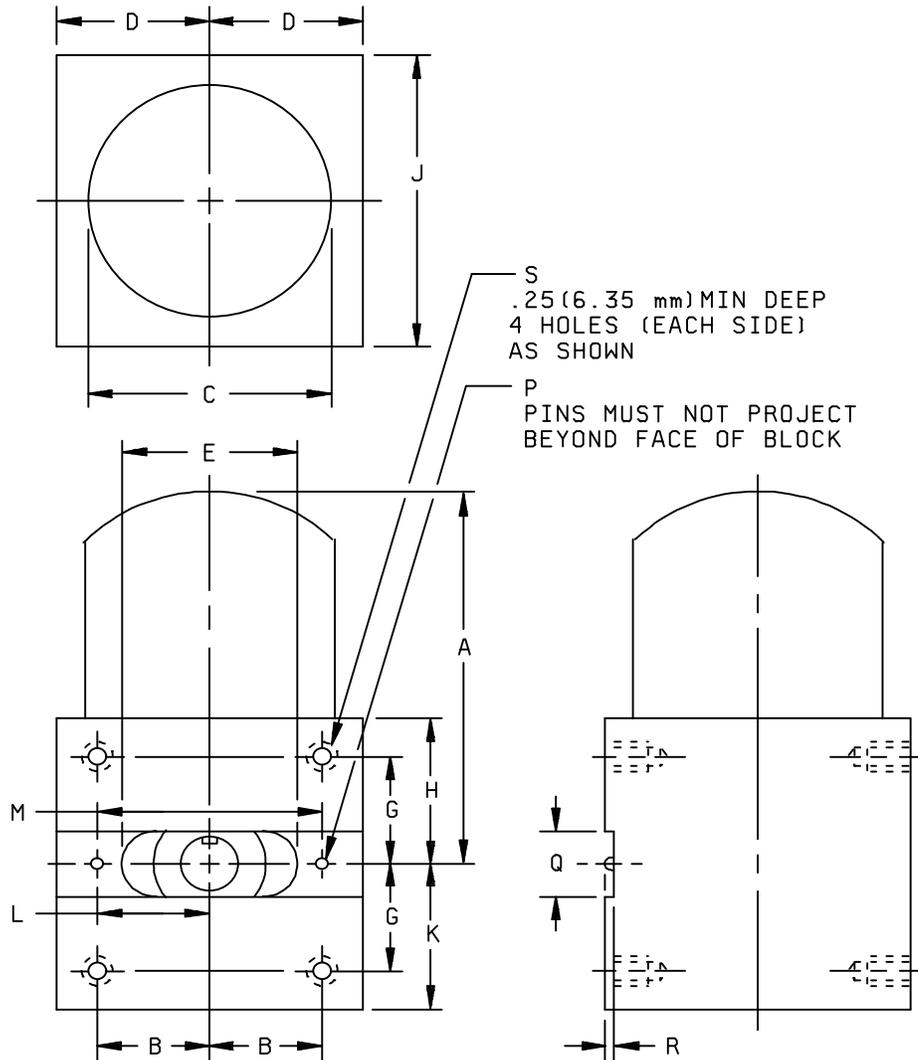
Inspection	Method	Conditions	Symbols	Limits Min	Limits Max	Units
<u>Conformance inspection, part 3</u> <u>-Continued</u>						
RF glow test	---	see note 5	---	---	---	---
Resonant frequency	---		1Q22Fo	9249.5	9250.5	MHz
			1Q23Fo	9279.5	9280.5	MHz
			1Q24Fo	9309.5	9310.5	MHz
			5846Fo	9279.6	9280.4	MHz
			6040Fo	9307.5	9308.5	MHz
			6041Fo	9311.5	9312.5	MHz
Qualification	---					
Temperature cycle (3)	---	T = 55°C to 100°C t = 30 minutes see note 3	1Q22Fo	9249.7	9250.3	MHz
			1Q23Fo	9279.7	9280.3	MHz
			1Q24Fo	9309.7	9310.3	MHz
			5846Fo	9279.7	9280.3	MHz
			6040Fo	9307.7	9308.3	MHz
			6041Fo	9311.7	9312.3	MHz
Temperature compensation (2)	---	Room temperature to 0°C	$\Delta F_o$	---	0.3	MHz
		Room temperature to -25°C	$\Delta F_o$	---	0.7	MHz
		Room temperature to -40°C	$\Delta F_o$	---	1.0	MHz
		Room temperature to -55°C see notes 4 and 7	$\Delta F_o$	---	1.2	MHz
Atmospheric pressure test	---	P = Atmospheric to 45 psi	$\Delta F_o$	---	0.15	MHz
		P = Atmospheric to 5 in. Hg	$\Delta F_o$	---	0.15	MHz

## NOTES:

- Electrical measurements are to be made with a standard frequency source having an absolute accuracy of the order of 1 part in 500,000. The cavities shall be tested mounted between UG-40/U chokes in RG-52/U waveguide and with a voltage standing wave ratio less than 1.05 due to resistive match looking into each of the chokes between which the cavity is mounted.
- The difference in resonant frequency before and after vibration shall not exceed the limits specified.
- The cavity shall be subjected to three complete cycles between the specified temperature extremes. The cavity may be allowed to come to equilibrium at room temperature in passing from one extreme to the other. The cavity shall be maintained at the extreme temperatures for the specified time during each cycle. When the tube has come to equilibrium at room temperature at the conclusion of the last two half cycles, the resonant frequency shall be measured and shall be within the specified limits.
- After temperature cycling described in note 3, the cavity shall be brought to equilibrium at the specified extreme temperature for 30 minutes and then returned to equilibrium at room temperature. Then it shall be brought to the specified extreme temperature again and allowed to return to room temperature. Resonant frequency measurements shall be made at approximately 20°C temperature intervals while returning to room temperature. At no temperature shall the resonant frequency differ from the value at room temperature by more than the specified amount.

NOTES: Table I. - Continued.

5. The tube shall show a typical diffuse low-pressure glow discharge when placed in an rf field.
6. The cavity may be allowed to come to equilibrium at room temperature in passing from one extreme to the other. The cavity shall be maintained at the extreme temperature for the specified time during each cycle. When the tube has come to equilibrium at room temperature, at the conclusion of the last two half cycles, the resonant frequency shall be measured and shall be within the specified limits.
7.  $\Delta F_0$  at  $-55^\circ\text{C}$  may be obtained by extrapolation of the data obtained at higher temperatures.
8. This test is not applicable to type 5846.



Dimensions				
Ltr	Inches		Millimeters	
	Min	Max	Min	Max
Conformance inspection, part 1				
J	1.744	1.756	44.30	44.60
* M	1.218 Nom		30.94 Nom	
* P	0.061	0.065	1.55	1.65
* Q	0.400	0.402	10.16	10.21
Conformance inspection, part 2				
A	---	2.187	---	55.55
B	0.608	0.612	15.44	15.54
C	---	1.375	34.	34.93

\* These Dimensions apply to 5846 only.

Dimensions				
Ltr	Inches		Millimeters	
	Min	Max	Min	Max
D	0.859	0.891	21.82	22.63
E	1.000 REF		25.4 REF	
G	0.638	0.642	16.21	16.31
H	---	0.828	---	21.03
K	---	0.875	---	22.23
* L	0.609 Nom		15.47 Nom	
* N	0.020	0.030	0.51	0.76
* R	0.028	0.030	0.71	0.76
S	8-32 UNC-28 THD			

FIGURE 1. Outline drawing of tube types 1Q22, 1Q23, 1Q24, 5846, 6040, and 6041.

MIL-PRF-1/296D

Custodians:

Army - CR  
Navy - EC  
Air Force - 85

Review activities:

Army - AR  
Navy - SH  
Air Force - 11, 80

Preparing activity:  
DLA - CC

(Project 5960-3454)