INCH-POUND

MIL-E-1/605E
17 January 2014
SUPERSEDING
MIL-E-1/605D
13 March 1975

MILITARY SPECIFICATION SHEET

ELECTRON TUBE, KLYSTRON

TYPE 6310

Inactive for new design
after 21 July 1997.

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 specification sheet and MIL-PRF-1.

DESCRIPTION: Reflex oscillator, integral cavity, tunable frequency range 8,500 to 10,000 MHz.

ABSOLUTE RATINGS:

Parameter:	Ef	Ers	Er	Irs	Tuner plate Temperature	tk	F	Alt
Unit:	V	Vdc	Vdc	mAdc	°C	(see note 1)	MHz	ft
Maximum:	7.0	350	-20 to -1,000	42	200	---	10,000	10,000
Minimum:	5.7	---	---	---	---	---	8,500	---

TEST CONDITIONS:

Parameter:	Ef	Ers	Er	Tuner plate temperatures	F
Unit:	V	Vdc	Vdc	°C	MHz
	6.3	300	-55 to -225	(see notes 2 and 3)	9,300 ± 0.3%

PHYSICAL CHARACTERISTICS: (See outline drawing)

GENERAL:

Qualification – Required

This specification sheet uses accept on zero defect sampling in accordance with MIL-PRF-1, table III.

TABLE I. Testing and inspection.

Requirement or test	MIL-STD-1311 Method	Conditions	Symbol	Limits		Unit
				Min	Max	
Qualification						
Operation vibration (1)	1031	Er(Mode 5)/max Po; 10G, F=-50 to 600 Hz; t=5 min	ΔF(p-p)	---	4	MHz
Shock	---	Er(Mode 5)/max Po; G=200; shock duration=0.001 sec See notes 5 and 8	ΔF	---	5	MHz
Electronic tuning range (2)	4280	Er(Mode 5)/50% max Po; F=8,500 to 10,000 MHz	ΔF(p-p)	30	---	MHz
Temperature coefficient	4027	Er(Mode 5)/max Po; TA=20° to 60°C	$\frac{\Delta F}{\Delta °C}$	0.0	-0.20	$\frac{MHz}{°C}$
Frequency modulation	---	Er(Mode 5)/max Po; Ef=5.7 to 7.0 Vdc	ΔF	---	0.1	MHz
Heater voltage coefficient	---	Ef=5.7 to 7.0 V	$\frac{\Delta F}{\Delta Ef}$	---	6	$\frac{MHz}{v}$
Mechanical tuning rate	4223	F=8,500 to 10,000 MHz	$\frac{\Delta F}{\Delta Tuner\ degrees}$	1.8	3	$\frac{MHz}{degree}$
Power output (3)	4250	Er(Mode 5)/max Po; F=8,500 to 10,000 MHz	Po	25	---	mW
Conformance inspection, part 1						
Operation vibration (2)	1031	10G, F=60, t=120 See note 4	Ir	0	10	μAdc
Reflector current	4229	See notes 6 and 7	Ir	---	3	μAdc
Emission	4214	Ef=5.7 See note 7	$\frac{\Delta Irs}{Irs}$	---	-15	%
Resonator current	4212	Er(Mode 5)/max Po	Po	20	32	mAdc
Power output (1)	4250	Er(Mode 5)/max Po	F	25	---	mW
Mechanical tuning range	4223	Er(Mode 5)/max Po; high frequency low frequency	F	10,000	---	MHz
Reflector voltage (1)	4213	Er(Mode 5)/max Po	Er	---	8,500	MHz
Broadband testing	---	Er(Mode 5)/max Po; at=8 db min; See note 9 VSWR=2.5/1 max		-115	-180	Vdc
Conformance inspection, part 2						
Heater current	1301		If	1.08	1.32	A
Power output (2)	4250	Er(Mode 5)/max Po;				
		F=8,500 ± 0.3% MHz;	Po	23	---	mW
		F=10,000 ± 0.3% MHz	Po	23	---	mW
Reflector voltage (2)	4213	Er(Mode 5)/max Po;				
		F=8,500 ± 0.3% MHz;	Er	-85	-135	Vdc
		F=10,000 ± 0.3% MHz	Er	-180	-225	Vdc
Electronic tuning range (1)	4280	Er(Mode 5)/50% max Po	ΔF	30	---	MHz
Electronic tuning hysteresic	4231	Er(Mode 5)/max Po	Ratio	---	0.5	---

See notes at end of table.

TABLE I. Testing and inspection. - continued

Requirement or test	MIL-STD-1311 Method	Conditions	Symbol	Limits		Unit
				Min	Max	
Conformance inspection, part 3						
Life-test	4551	Group C, power output (1) conditions	t	500	---	hr
Life-test end points:	4551					
Power output (1)	4250	Er(Mode 5)/max Po	Po	20	---	mW
Reflector current	4229	See notes 6 and 7	Ir	---	10	µAdc

NOTES:

1. No warm-up time is required in order to obtain the specified life from the tube. If extended life is desired, a heater warm-up period of approximately 1 minute is recommended before the application of the resonator voltage.

2. All oscillation tests except vibration tests shall be made with the tube rigidly connected to a UG39/U flange on approximate R352/U waveguide equipment and the load VSWR for the tube shall be less than 1.1. Forced-air cooling is required for power inputs above 10 watts.

3. The temperature of base and cap of the tube shall not exceed 120°C.

4. The reflector current shall be recorded with a Brush Model BL202 recorder, or equivalent. There shall be no reflector current bursts greater than the limit shown.

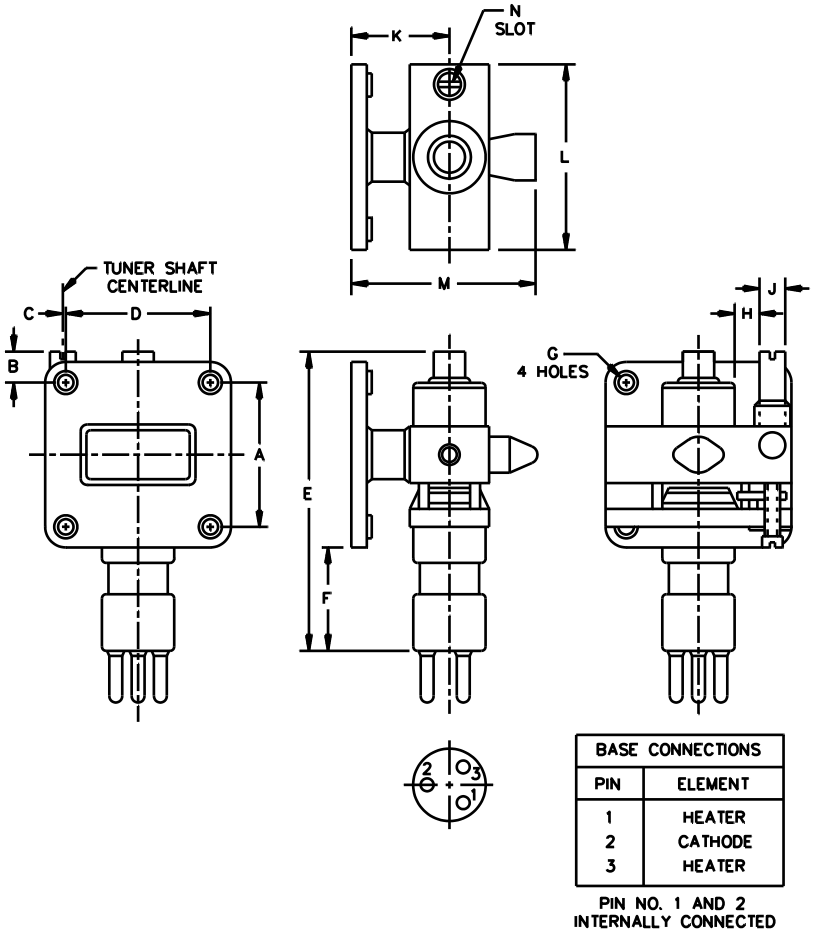
5. The tube shall be given five shocks in each of three planes. The frequency shift after shock in one plane shall not exceed the value specified.

6. After 2 minutes with all voltages applied, total reflector current shall not exceed the specified limits.

7. The tube shall not be oscillating during the test.

8. Connection to the tube shall be made with an Amphenol 78-S3S-1001-3 pin connector and a miniature type cap connector, or equivalents. Flexible leads shall be used in making connections to the tube.

9. Superimposing sufficient 60-hertz ac voltage on the direct reflector voltage to suppress oscillation on the ends of the sweep, the mode curve shall be observed on an oscilloscope whose amplifier has minimum bandpass of 0.1 MHz. With a standing wave introducer inserted, there shall be no discontinuities at the maximum power point for any phase of the standing wave. If the center of the mode is distorted, a wavemeter pip shall not disappear for an interval of the mode center as the wavemeter is tuned to check for a frequency discontinuity.



Dimensions				
Ltr	Inch		mm	
	Min	Max	Min	Max
Qualification				
F		1.000		25.40
H	.160		4.06	
L		1.750		44.45
Conformance Inspection, Part 1				
A	1.276	1.284	32.41	32.61
D	1.216	1.224	30.89	31.09
M		1.750		44.45
Conformance Inspection, Part 2				
C	.010	.070	0.25	1.78
J	.248	.250	6.30	6.35
K	.850	.936	21.59	23.77
E		3.125		79.38
Nominal Dimensions				
B	.187		4.75	
G	.219 .185		5.56 4.70	
N	.050 Wide .220 Deep		1.27 5.59	

NOTES:
1. Metric equivalents are based upon 1 inch = 25.4 mm.
2. Nominal dimensions are for information only and are not required for inspection purposes.
3. Base: Peewee 3 Pin, A3-1.
4. Cap: C1-4.

FIGURE 1. Outline drawing of type 6310.

Referenced documents. In addition to MIL-PRF-1, this document references the following: MIL-STD-1311.

The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Army - CR
Navy - EC
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

(Project 5960-2013-030)

Review activities:
Navy - CG, MC, SH
Air Force - 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.dla.mil/.