

INCH-POUND

MIL-PRF-1/1718A  
25 September 1998  
SUPERSEDING  
MIL-E-1/1718  
1 June 1972

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, GAS SWITCHING

TYPE 8922 \*

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 document and the latest issue of MIL-PRF-1.

DESCRIPTION: Passive TR-limiter, crystal protector, ignitorless, 2,600 to 3,100 MHz.

ABSOLUTE RATINGS:

Parameter:	Incident power	Du	tp	Pressurization	Temperature		Altitude
					Operating	Nonoperating	
Unit:	kw	---	μs	psia	°C	°C	ft
Maximum:	50	0.03	36	40	+65	+75	30,000
Minimum:	0	---	---	---	0	-62	---

PHYSICAL CHARACTERISTICS:

Dimensions:	See figure 1.	Mounting:	Input and output flanges mate with M3922/61-1.
Mounting position:	Any.	Flanges:	See note 1 of figure 1.
Cooling:	Convection.		
Finish:	See note 2 of figure 1.		

TEST CONDITIONS:

Parameter:	Incident power	Du	tp	F
Unit:	kw	---	μs	MHz
Tolerance:	±10%	min	±0.10	±3%
	30	0.007	6.0	F3

Frequency		
F	MHz	±
1	2,600	0.1%
2	2,900	0.1%
3	3,000	0.1%
4	3,100	0.1%

GENERAL:

First article testing: Required 1/  
Service life guarantee: 2/3/  
Shelf life: 3/

\* Replaces type GIB 182858-1 and Varian VT-8-1003.

TABLE I. Testing and inspection.

Inspection	Method	Notes	Conditions	Symbol	Limits		Unit
					Min	Max	
<u>Conformance inspection, part 1</u>							
Low-level VSWR	4473	4/	F = F2 through F4	$\sigma$	---	1.35	---
Insertion loss	4416	---		Li	---	0.4	dB
Flat-leakage power	4452	---		pf	---	60	mw
Spike-leakage energy	4452	---		Ws	---	0.15	erg
Recovery time	4471	---		t	---	20	$\mu$ s
Firing power	4496	---		Po/Du	---	200	mw
Temperature cycling (nonoperating)	1027	5/	One cycle	---	---	---	---
<u>Conformance inspection, part 2</u>							
Noise ratio	---	6/	40 psia; 1 cycle	Nr	---	1.05	---
Pressurizing	4003	5/ 8/		---	---	---	---
Dielectric material strain	4101	7/		---	---	---	---
Permanence of marking	1105	---		---	---	---	---
<u>Conformance inspection, part 3</u>							
Life test	---	2/ 3/	Group S	t	2,000	---	hrs
Life-test end points:	---						
Crystal degradation	---	9/ 10/	F = F2 through F4	$\Delta$ NF	---	2.0	dB
Insertion loss	4416	---		Li	---	0.5	dB
Spike-leakage energy	4452	---		Ws	---	0.3	erg
Recovery time	4471	---		t	---	30	$\mu$ s
Firing power	4496	---		Po/Du	---	600	mw

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Notes	Conditions	Symbol	Limits		Unit
					Min	Max	
<u>Conformance inspection, part 3</u> - Continued							
<u>Periodic-check tests</u>							
Pressurizing	4003	<u>5/ 8/</u>	40 psia; 10 cycles	---	---	---	---
Shock, specified pulse	1042	<u>11/</u>	Test condition A	---	---	---	---
Vibration, mechanical	1032	<u>12/</u>		---	---	---	---
Temperature cycling life test	1027	<u>5/</u>	40 psia; 10 cycles	---	---	---	---
Humidity	---	<u>13/</u>		---	---	---	---
Performance degradation	---	<u>14/</u>		---	---	---	---

1/ First article testing requirements hereby replace any qualification requirements referable to the product covered herein. The term "First article testing" shall be considered as synonymous with the term "Preproduction sample approval testing." All tests applicable herein (including all First article tests and conformance inspection, parts 1, 2, and 3) shall be performed during first article testing. A failure of any one tube in any of the tests shall be cause for decision of first article sample disapproval. The contractor/manufacturer shall provide test reports and written assurance that:

- a. The first article sample is representative of the product to be submitted under the contract.
- b. First articles shall be manufactured from new materials and in the facility that produced the sample tubes.

A test plan shall be submitted to the contracting officer for approval prior to proceeding with first article testing. The test plan shall list all production test and laboratory test facilities to be utilized in first article testing and production phases of the contract. Upon receipt of approval of the test plan, first article testing may proceed. When testing has been completed, three copies of the test report shall be prepared in accordance with MIL-STD-831, certified by a Government representative and submitted with the test samples to the contracting officer for approval.

- 2/ Life tests shall not be required after the tubes under test (TUT) have satisfied all requirements of this document for first article approval. However, a service-life guarantee of 2,000 hours minimum shall be required in accordance with the requirements of MIL-PRF-1. Life for purpose of the service-life guarantee shall be defined as the total of operating time. The sum of the operating and shelf life shall be not less than 21 months.
- 3/ The tubes tested and acquired in accordance with this tube specification sheet shall be capable of shelf-life for a period of 18 months after date of shipment from the manufacturer's plant. Tubes placed in operation during this shelf-life period shall meet all requirements of this tube specification sheet. Tubes found to be defective within the shelf-life period shall be replaced by the manufacturer at no cost to the Government or its contractors.
- 4/ Unless otherwise specified, the acceptance level for all tests listed under conformance inspection, part 1, shall be 1.0, inspection level II.
- 5/ After the completion of this test, the TUT shall satisfy all requirements of method 4452 (spike-leakage energy), as specified in conformance inspection, part 1.

TABLE I. Testing and inspection - Continued.

- 6/ The noise ratio shall be defined as the ratio of the IF attenuation required to reduce the output noise level with the TUT installed to that value when the TUT is removed from the circuit. The noise ratio can be determined from the following equation:

$$Nr = 1 + \frac{\text{anti log } (0.1F) [\text{anti log } (0.1Y) - 1]}{2}$$

Where F = Receiver noise figure in dB.

Y = IF attenuation required to reduce the output noise level with the TUT installed in the circuit to that with the TUT removed from the circuit.

NOTE: The denominator in the second term is applicable only if no preselector is used.

- 7/ After the completion of this test, the TUT shall satisfy all requirements of method 4471 (recovery time), as specified in conformance inspection, part 1.
- 8/ The specified air pressure shall be applied to the input window of the TUT for a period of 30 minutes, after which the pressure shall be reduced to atmospheric pressure. This test shall be performed by immersing the seal and tube flange in water. The maximum allowable leak rate shall be one bubble per 30 seconds. Bubbles due to occluded air shall be disregarded. This test shall be performed for the number of cycles specified.
- 9/ The tube shall be terminated with a type 1N21E crystal mounted in a crystal holder and be provided with a dc ground return of 100 ±10 ohms. At the beginning of the life test, the crystal noise figure (NF) shall meet the minimum requirements for the type 1N21E crystal under the standard specified conditions. The initial crystal noise figure shall be measured and recorded. The crystal noise figure shall be remeasured periodically during the course of life testing. Life test shall be considered completed when the 1N21E crystal noise figure degradation (ΔNF) from the initial value has exceeded the specified limit.
- 10/ One crystal failure will be allowed during the life test. If a crystal failure occurs, a new crystal shall be inserted in the mount and the life test shall continue for a minimum of 200 hours, even if the life test is extended beyond the required 2,000 hours.
- 11/ The TUT shall be shocked 5 times in the direction shown in figure 1 when actual mounting conditions are simulated. The TUT shall be capable of satisfying all requirements of this document without damage or failure before, during, and after being subjected to the specified shock test.
- 12/ Vibration. The TUT shall be capable of satisfying all requirements of this document without damage or failure before, during, and after being subjected to the specified vibration test with the amplitude as specified herein.

<u>Frequency (Hz)</u>	<u>Amplitude (Inches)</u>
5 to 15	0.075 ± .012 (0.150 Total displacement)
16 to 25	0.050 ± .008 (0.100 Total displacement)
26 to 33	0.025 ± .004 (0.050 Total displacement)

- 13/ The TUT shall perform as specified herein without degradation of performances when its operating or nonoperating humidity environment has a relative humidity up to 95 percent, including condensation at any temperature up to 50°C (122°F).
- 14/ The TUT shall not exhibit damage or degradation of performance resulting from spurious signals within F1 through F2 and with incident power = 5 kw maximum.

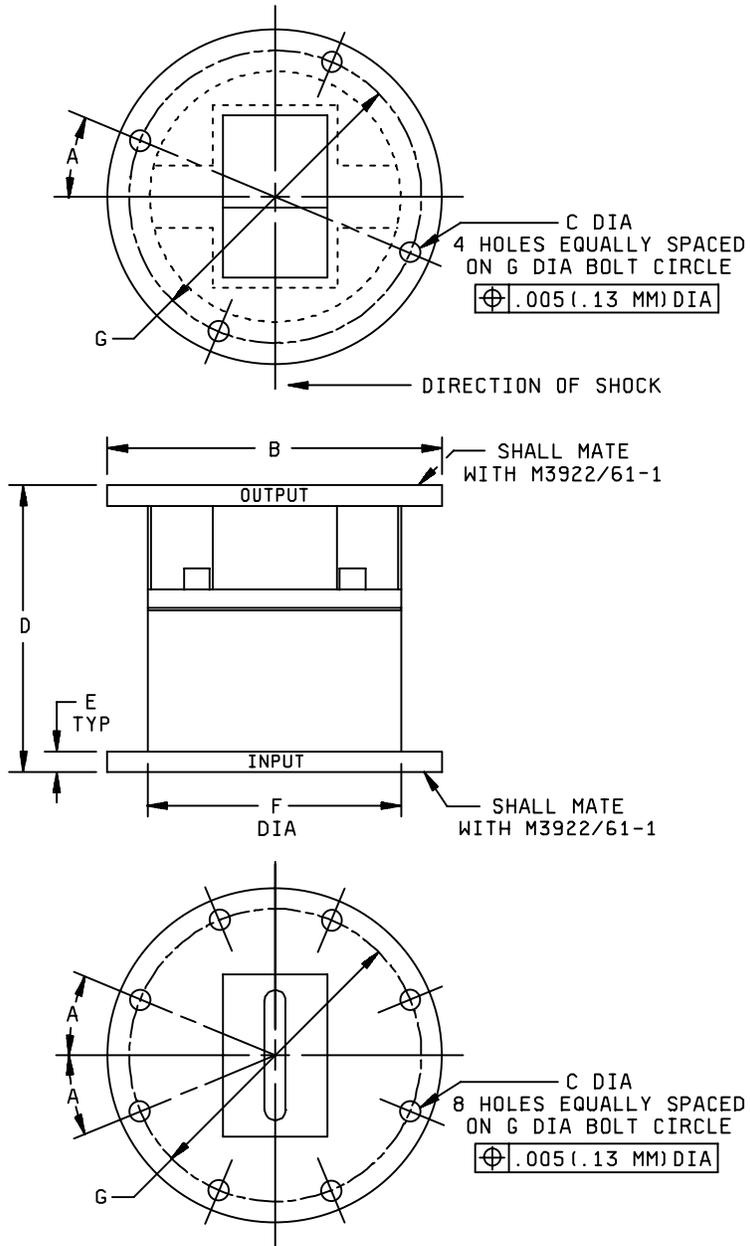


FIGURE 1. Outline drawing of electron tube type 8922.

MIL-PRF-1/1718A

Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
First article sample inspection				
A	22°		23°	
E	.235	.265	5.97	6.73
F	---	4.000	---	101.60
Conformance inspection, part 1				
C	.256	.261	6.50	6.63
D	3.469	3.531	88.11	89.69
Conformance inspection, part 2				
B	5.297	5.327	134.54	135.31
G	4.745	4.755	120.52	120.78

NOTES:

1. The waveguide flanges of the TR tube shall be cold rolled steel.
2. All external and interface surfaces of the TR tube, with the exception of the aluminum parts, shall be corrosion protected using cadmium plate in accordance with Federal Specification QQ-P-416, type II, class 1, or equivalent. Aluminum parts shall have a chemical film finish in accordance with MIL-PRF-5541 or equivalent.. All external surfaces with the exception of the mating surfaces of the waveguide flanges shall be wash primed in accordance with MIL-PRF-8507 one coat .0002 inch (0.005 mm) to .0005 inch (0.013 mm) thick with primer in accordance with MIL-PRF-15328 or equivalent. Paint two coats .001 inch (0.03 mm) thick with gray enamel in accordance with MIL-PRF-15090, type II, class 2 ,or equivalent.
3. The rf input and output shall be marked as indicated.
4. The rf input and output flanges shall mate with M3922/61-1.

FIGURE 1. Outline drawing of electron tube type 8922 - Continued.

Custodian:  
 Army - CR  
 Navy - EC  
 Air Force - 85

Preparing activity:  
 DLA - CC  
 (Project 5960-3484)

Review activities:  
 Army - AR, MI  
 Navy - AS, CG, MC, OS  
 Air Force - 99