INCH-POUND

MIL-PRF-1/906E
7 May 2004
SUPERSEDING
MIL-PRF-1/906D
23 July 1999

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, RADIATION COUNTER
TYPE 5979

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: Mica end window, halogen-filled, high sensitivity, self-quenching for detection of beta and gamma radiations.

Dimensions: See figure 1.

Mounting position: Any.

Weight: 2.82 ounces nominal.

ABSOLUTE RATINGS:

Parameter:	Ebb	TA	Rp
Unit:	V dc	°C	Meg
Maximum:	725	75	---
Minimum:	675	-40	---
Test conditions:	700	---	1.0

See footnotes at end of table I.

GENERAL:

Qualification: Required. 2/

Holding period: 11/

Marking: 3/, 16/. Tubes sold under service-life guarantee shall be marked with contract number and with the number of operating hours (500 hours minimum) guaranteed.

Response characteristics: 1/

Service-life guarantee (MIL-PRF-1): With qualifying activity approval manufacturer may provide service-life guarantee, in lieu of life test. Guaranteed tube operating time shall be 500 hours minimum. 16/

Comments, suggestions or questions on this document should be addressed to Defense Supply Center Columbus, ATTN: DSCC-VAT, P.O. Box 3990, Columbus, OH 43216-5000 or e-mailed to TubesFiberOptic@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at www.dodssp.daps.mil.

TABLE I. Testing and inspection.

Inspection	MIL-STD-1311 Method	Notes	Conditions	Acceptance level	Symbol	Limits		Unit
						Min	Max	
Conformance inspection, part 1								
Background, contamination and photosensitivity	6201	5/	t = 2 minutes	0.65	N/t	---	60	Npm
Photosensitivity	6201	5/ 6/	t = 2 minutes	0.65	N/t	---	20	Npm
Starting voltage	6211	---	Pulse amplitude = 1 volt; R1 = C1 = C2 = 0; R2 = 1 Meg; C3 = 0.01 µF; Nps = 200 (max)	0.65	Es	---	640	V dc
Relative plateau slope	6216	---	Voltage range = 660 to 760 V dc	0.65	Ps	---	0.2	%/V dc
End-of-plateau voltage	6216	14/	Ps = 0.3%/V dc	0.65	Ee	800	---	V dc
Plateau length	6216	13/		0.65	Pl	200	---	V dc
Response count rate and current (gamma)	6221	---	t = 2 minutes	0.65	N/t	85	115	Nps
Conformance inspection, part 2								
Response count rate and current (beta)	6221	---	t = 2 minutes	---	N/t	8/	---	---
Response count rate and current	6221	---	Gamma (radium); rate = 5 mr/hr; Ebb = 710 V dc	---	Ib	---	5	µA dc
Pulse amplitude (1)	6226	---	Ebb = 675 V dc; Nps = 200 (max); R1 = 0.9 Meg ± 10%; R2 = 0.1 Meg ± 10%; C1 = 330 pF ± 10% ; C2 = 3,000 pF ± 10%; C3 = 0.01 µF ± 10%; multiply oscilloscope reading by 10	---	eo	2.5	---	v
Pulse amplitude (2)	6226	---	Ebb = 725 V dc; Nps = 200 (max); R1 = 0.9 Meg ± 10%; R2 = 0.1 Meg ± 10%; C1 = 330 pF ± 10%; C2 = 3,000 pF ± 10%; C3 = 0.01 µF ± 10%; multiply oscilloscope reading by 10	---	eo	---	65	v

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	MIL-STD-1311 Method	Notes	Conditions	Acceptance level	Symbol	Limits		Unit
						Min	Max	
Conformance inspection, part 3								
Life-test provisions	---	16/	Group A; counting rate = 1,000 Nps (min); t = 500 hours	---	---	---	---	---
Life-test end point:	---	10/ 16/		---	---	---	---	---
Variable-frequency vibration	1031	4/ 12/ 15/		---	---	---	---	---
Temperature cycling	---	9/ 14/		---	---	---	---	---
Shock	1041	4/ 7/ 15/	Hammer angle = 40°	---	---	---	---	---
Leakage current	6205	14/	Ebb = 500 V dc	---	LIb	---	0.5	µA dc

1/ The response characteristics, current, and count rate versus field intensity, of a typical type 5979 radiation counter tube are shown on figure 3. In determining tube response, Ebb = 700 V dc and Rp = 1 Meg. Tube current is shown as measured by means of a microammeter in series with the tube cathode, and the count rates as determined using a scaler having a resolving time of 5 microseconds and a discrimination level of 0.25 volts.

2/ A minimum of 28 samples shall be submitted for qualification test. The samples to be submitted for qualification testing will be broken down into the following subgroups:

a. Shelf life only 6

b. Electrical, including life test 6

c. Shock test only 10

d. Variable-frequency vibration 6

3/ Each tube is to have an individual serial number permanently marked on the cathode.

4/ Criterion for passing this test shall be compliance after test of at least 80 percent of the tubes with the requirement for:

a. Starting voltage.

b. Response (count rate) (1).

c. Pulse amplitude (1) and (2).

d. End-of-plateau voltage.

e. Relative plateau slope.

5/ In determining tube response (count rate) Ebb = 700 V dc and Rp = 1 Meg ± 10 %. Tube count rates shall be determined using a scaler having a resolving time of 5 microseconds and a discrimination level of 0.25 volts.

6/ The tube end window shall be exposed to radiation from a General Electric 15-watt germicidal lamp and a General Electric 15-watt fluorescent lamp, or equivalents, with relative positions as shown on figure 2.

TABLE I. Testing and inspection - Continued.

7/ The tube shall be rigidly mounted in axes X, Y, and Z by means of a clamp at the center of the cathode. The tube shall be given 10 blows in the X axis and 5 blows in each of the other test axes.

8/ The counting rate shall not vary by more than ± 0.3 N/t from the value of N/t of the calibrated beta source furnished with the standard excitation unit.

9/ With the tube in a field giving 100 ± 10 Nps at 700 V dc, determine tube response (count rate) at 675, 700, and 725 V dc at each of the following temperatures and in the order shown:

a. Room temperature.

b. -40°C.

c. Room temperature.

d. +75°C.

e. Room temperature.

A minimum stabilization time of 30 minutes is to be allowed at each temperature. The absolute count rate of 700 V dc, and the average relative plateau slope as determined by the readings at the 3 voltages (best average position of straight line), shall not differ from the initial readings at room temperature by more than 10 percent, and ± 0.1 percent/volt, respectively, at any of the four subsequent temperatures shown above.

10/ The limits for acceptability shall be as follows:

Photosensitivity: 35 Npm, maximum.
Background and contamination: Initial value + 20 Npm, maximum.
Starting voltage: Initial value ± 10 volts.
Plateau length: 150 volts, minimum.
Relative plateau slope: 0.25 percent/V dc, maximum.
End-of-plateau voltage: 760 volts, minimum.
Response (count rate) (1): Initial value ± 10 percent.
Pulse amplitude (1) and (2): Initial limits.

11/ The following tests shall be performed at the beginning and at the conclusion of the holding period: Photosensitivity, background, and contamination, starting voltage, response (count rate) (1), and pulse amplitude (1) and (2), except that starting voltage shall not vary more than 10 volts.

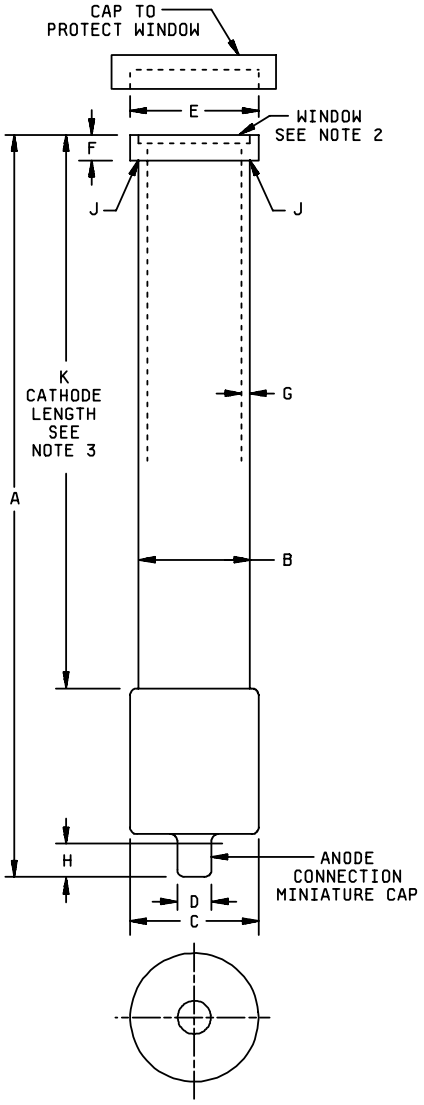
12/ The tube shall be mounted with its longitudinal axis horizontal and perpendicular to the direction of motion by means of a rigid clamp at the center of the cathode.

13/ Method B (test method 6216); the scaler of 5/ may be utilized for this test.

14/ This test shall be performed during the initial production and once each succeeding 12-calendar months in which there is production. An accept on zero defect sampling plan shall be used, with sample of three tubes with an acceptance number of zero defects. In the event of failure, the test will be made as a part of conformance inspection, part 2, with an acceptance level of 6.5. This specification sheet uses accept on zero defect sampling in accordance with MIL-PRF-1, table III. The regular "12-calendar month" sampling plan shall be reinstated after three consecutive samples have been accepted

15/ The manufacturer, with the approval of the qualifying activity, may perform this test on a periodic basis, versus performing the test on every lot. Approval will be based on demonstrating to the qualifying activity the capability of the design to meet this requirement. If the design, material construction or processing of the tube is changed or if there are any quality problems, the qualifying activity may require resumption of the original testing frequency. This allowance does not relieve the manufacturer from meeting the test requirements in case of dispute.

16/ With qualifying activity approval the manufacturer may provide, in accordance with MIL-PRF-1, service-life guarantee, in lieu of performing life testing. Life test endpoints specified shall apply to service-life guarantee conformance as well as to life test conformance. The number of hours of system-deployed, accumulated tube-operating time shall be approved by the qualifying activity and shall be a minimum of 500 hours. Service-life guarantee shall define tube operating life and not time from purchase or delivery. Tubes sold under service-life guarantee shall be marked with contract number and with the number of tube operating hours guaranteed.

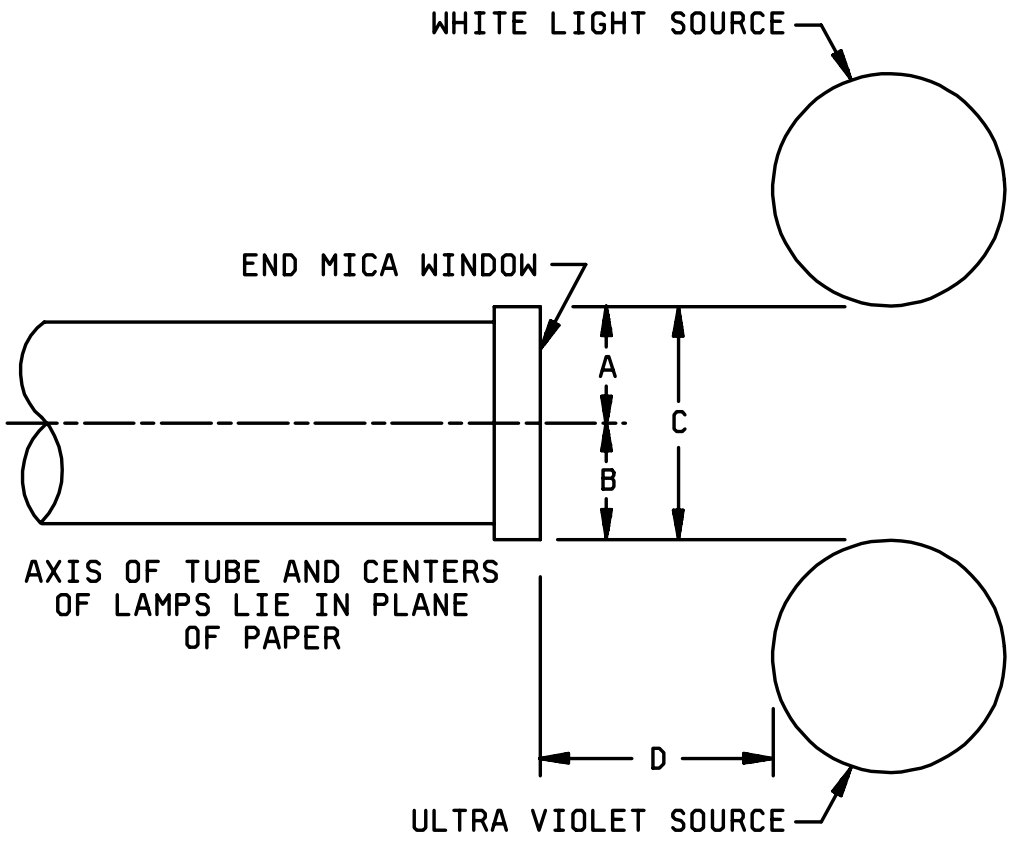


Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
Conformance inspection, part 2				
A	5.750	6.000	146.05	152.40
B	.860	.890	21.84	22.61
C	---	1.000	---	25.40
E	.985	1.015	25.02	25.78
Conformance inspection, part 3 (see note 4)				
D	.245	.255	6.22	6.48
F	.150	.225	3.81	5.72
G	.047	.078	1.19	1.98
H	.250	---	6.35	---
J	89°		91°	
K	4.250	4.500	107.95	114.30

NOTES:

1. The envelope will not have an exposed seal-off tip.
2. Mica window 3.0 to 4.0 milligrams per cm^2.
3. Cathode: Allegheny Ludlum Sealmet 1 Steel for glass to metal seals, or equal.
4. Dimensions shall be checked during the initial production and once each succeeding 12-calendar months in which there is production. An accept on zero defect sampling plan shall be used, with sample of three tubes with an acceptance number of zero defects. In the event of failure, the test will be made as a part of conformance inspection, part 2, with an acceptance level of 6.5. This specification sheet uses an accept on zero sampling in accordance with MIL-PRF-1, table III. The regular "12-calendar month" sampling plan shall be reinstated after three consecutive samples have been accepted.

FIGURE 1. Outline drawing of electron tube type 5979.



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.498	.502	12.65	12.75
B	.498	.502	12.65	12.75
C	---	1.00	---	25.4
D	---	1.00	---	25.4

FIGURE 2. Position of tube for photosensitivity test.

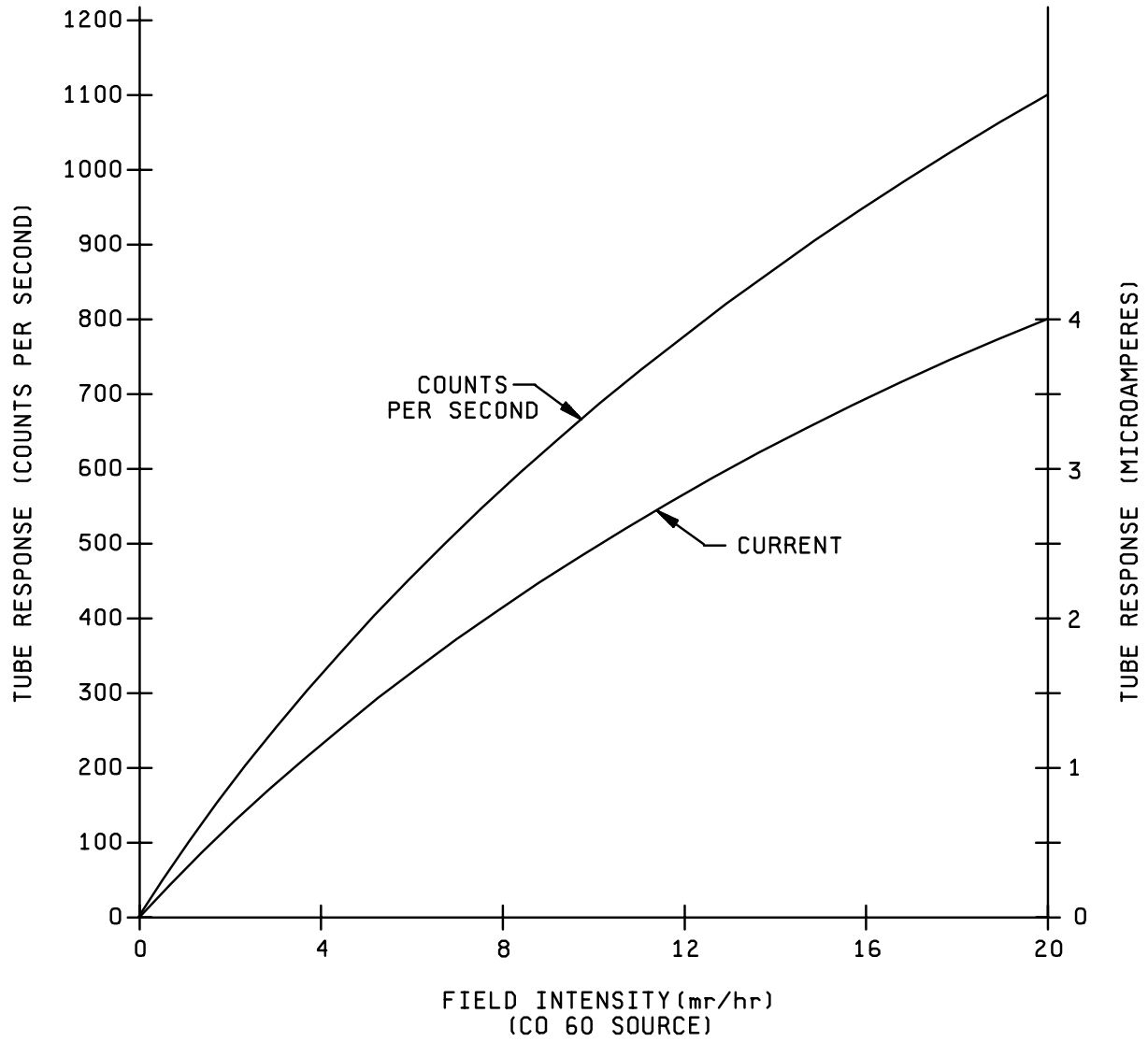


FIGURE 3. Response characteristics of typical type 5979 counter tube

NOTES

Referenced documents. In addition to MIL-PRF-1, this specification sheet references MIL-STD-1311.

Changes from previous issue. The margins of this specification sheet 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 - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5960-3705)

Review activities:
Navy - AS, CG, MC, OS
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 curency of the information above using the ASSIST Online database at www.dodssp.daps.mil.