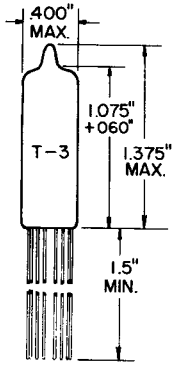
TUNG-SOL

TRIODE

SUBMINIATURE TYPE



GLASS BULB

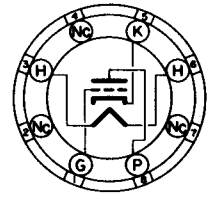
COATED UNIPOTENTIAL CATHODE

HEATER

6.3±5% VOLTS 0.15 AMP.

AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
SUBMINIATURE BUTTON
8 LEAD BASE

8DK

THE 5719 IS A SUBMINIATURE HIGH-MU TRIODE DESIGNED FOR USE AS AN AUDIO-FREQUENCY VOLTAGE AMPLIFIER. BECAUSE OF ITS LOW MICROPHONIC CHARACTERISTICS, THE TUBE CAN BE EMPLOYED AT RELATIVELY LOW SIGNAL LEVELS.

DIRECT INTERELECTRODE CAPACITANCES

	WITH SHIELD[A]	WITHOUT SHIELD	
GRID TO PLATE	0.8	0.8	μμf
INPUT	1.9	1.7	μμf
OUTPUT	2.2	0.6	μμf

[A] WITH EXTERNAL SHIELD OF 0.405 INCH INSIDE DIAMETER CONNECTED TO CATHODE.

RATINGS

ABSOLUTE MAXIMUM VALUES

HEATER VOLTAGE	6.3±5%	VOLTS
MAXIMUM PLATE VOLTAGE	165	VOLTS
MAXIMUM NEGATIVE DC GRID VOLTAGE	55	VOLTS
MAXIMUM PLATE DISSIPATION	0.1	WATTS
MAXIMUM DC PLATE CURRENT	3.3	MA.
MAXIMUM HEATER-CATHODE VOLTAGE:		
HEATER POSITIVE WITH RESPECT TO CATHODE	200	VOLTS
HEATER NEGATIVE WITH RESPECT TO CATHODE	200	VOLTS
MAXIMUM GRID CIRCUIT RESISTANCE	1.2	MEGOHMS
MAXIMUM BULB TEMPERATURE AT HOTTEST POINT	220	C

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TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3±5%	VOLTS
HEATER CURRENT	0.15	AMP
PLATE VOLTAGE	100	VOLTS
CATHODE-BIAS RESISTOR	1500	OHMS
AMPLIFICATION FACTOR	70	
PLATE RESISTANCE (APPROX.)	41,000	OHMS
TRANSCONDUCTANCE	1700	μMHOS
PLATE CURRENT	0.73	MA.
GRID VOLTAGE (APPROX.) Ib = 10 μAMPS.	−2.5	VOLTS

CLASS A RESISTANCE - COUPLED AMPLIFIER

LOW IMPEDANCE DRIVE (APPROXIMATELY 200 OHMS)

R_L	R_{gf}	Ebb = 90 VOLTS			Ebb = 150 VOLTS			Ebb = 225 VOLTS		
		R_k	E_o	GAIN	R_k	E_o	GAIN	R_k	E_o	GAIN
0.10	0.10	2000	3.5	30	1200	11	38	1000	22	41
0.10	0.24	2300	5.3	35	1400	14	43	1100	27	46
0.24	0.24	4700	5.1	36	2900	12	44	2100	24	49
0.24	0.51	5100	6.6	39	3300	16	47	2500	30	51
0.51	0.51	9000	5.8	38	5800	13	46	4600	25	49
0.51	1.0	10000	7.6	42	6800	17	48	5600	31	51

HIGH IMPEDANCE DRIVE (APPROXIMATELY 100K OHMS)

R_L	R_{gf}	Ebb = 90 VOLTS			E_{bb} = 150 VOLTS			Ebb = 225 VOLTS		
		R_k	E_b	GAIN	R_k	E_o	GAIN	R_k	E_o	GAIN
0.10	0.10	2700	6.7	29	1700	14	37	1300	25	40
0.10	0.24	3200	9.1	34	2000	18	41	1500	32	45
0.24	0.24	5600	8.7	34	3600	17	42	2700	29	47
0.24	0.51	6300	11	38	4200	22	45	3200	37	49
0.51	0.51	11000	9.5	37	7000	19	44	5300	32	49
0.51	1.0	12000	12	40	8000	24	47	6300	40	51

1. E_o IS MAXIMUM RMS VOLTAGE OUTPUT FOR APPROXIMATELY 5% TOTAL HARMONIC DISTORTION.

2. GAIN IS MEASURED FOR AN OUTPUT VOLTAGE OF TWO VOLTS RMS.

3. R_k IS IN OHMS; R_L AND R_{gf} ARE IN MEGOHMS.

4. COUPLING CAPACITORS (C) SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. R_k SHOULD BE ADEQUATELY BY-PASSED.

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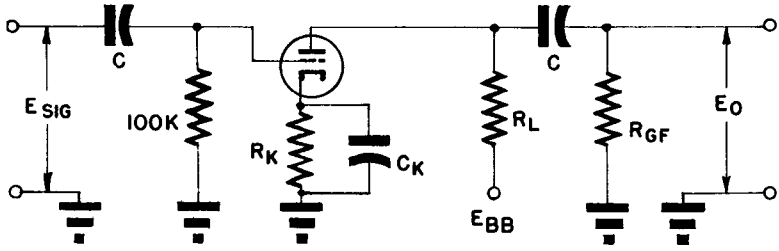

CHARACTERISTICS LIMITS

		MIN.	MAX.	
HEATER CURRENT	INITIAL	140	160	MA.
Ef = 6.3 V.	500 HR.	138	164	MA.
PLATE CURRENT				
Ef=6.3 V., Eb =100 V., Rk = 1500 OHMS				
(BY-PASSED)	INITIAL	0.5	0.9	MA.
TRANSCONDUCTANCE (1)				
Ef =6.3 V., Eb =100 V., Rk = 1500 OHMS				
(BY-PASSED)	INITIAL	1400	2000	μMHOS
TRANSCONDUCTANCE CHANGE WITH HEATER VOLTAGE:				
DIFFERENCE BETWEEN TRANSCONDUCTANCE (1) AND TRANSCONDUCTANCE AT Ef =5.7 V., (OTHER CONDITIONS THE SAME) EXPRESSED AS A PERCENTAGE OF TRANSCONDUCTANCE (1)	INITIAL	---	10	PERCENT
	500HR.	---	15	PERCENT
TRANSCONDUCTANCE CHANGE WITH OPERATION:				
DIFFERENCE BETWEEN TRANSCONDUCTANCE (1) INITIALLY AND AFTER OPERATION EXPRESSED AS A PERCENTAGE OF INITIAL VALUE	500 HR.	---	20	PERCENT
AVERAGE TRANSCONDUCTANCE CHANGE WITH OPERATION:				
AVG. OF VALUES FOR 'TRANSCONDUCTANCE CHANGE WITH OPERATION'	500 HR.	---	15	PERCENT
AMPLIFICATION FACTOR:				
Ef =6.3 V., Eb =100 V., Rk = 1500 OHMS				
(BY-PASSED)	INITIAL	60	80	
PLATE CURRENT CUTOFF (1)				
Ef = 6.3 V., Eb =100 V., Ec =-2.5 V.,	INITIAL	---	50	μAMPS.
PLATE CURRENT CUTOFF (2)				
Ef =6.3 V., Eb =100 V., Ec =-1.8 V.	INITIAL	5	---	μAMPS.

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CHARACTERISTICS LIMITS - cont'd.

		MIN.	MAX.	
AC AMPLIFICATION:				
(RMS OUTPUT VOLTAGE FROM FIXED INPUT SIGNAL)				
Ef =6.3 V., Ebb=100 V., Ecc=0 V				
Esig = 0.2 V., RMS	INITIAL	8.0	---	VOLTS
INTERELECTRODE CAPACITANCES:				
GRID TO PLATE (G TO P)	INITIAL	0.6	1.0	μμf
INPUT (G TO K+H)	INITIAL	1.2	2.2	μμf
OUTPUT (P TO K+H)	INITIAL	0.4	0.8	μμf
(MEASURED WITHOUT EXTERNAL SHIELD)				
NEGATIVE GRID CURRENT				
Ef =6.3 V., Eb =150 V., Rk= 2700 OHMS				
(BY-PASSED), Rg = 1.0 MEG.	INITIAL	---	0.3	μAMPS.
	500 HR.	---	0.6	μAMPS.
HEATER-CATHODE LEAKAGE CURRENT:				
Ef =6.3 V., Ehk =100 V.,				
HEATER POSITIVE WITH RESPECT				
TO CATHODE	INITIAL	---	5.0	μAMPS.
	500 HR.	---	10	μAMPS.
HEATER NEGATIVE WITH RESPECT				
TO CATHODE	INITIAL	---	5.0	μAMPS.
	500 HR.	---	10	μAMPS.
INTERELECTRODE LEAKAGE RESISTANCE:				
Ef =6.3 V., POLARITY OF APPLIED DC				
INTERELECTRODE VOLTAGE IS SUCH THAT				
NO CATHODE EMISSION RESULTS				
GRID TO ALL AT 100 VOLTS DC	INITIAL	100	---	MEGOHMS
	500 HR.	25	---	MEGOHMS
PLATE TO ALL AT 300 VOLTS DC	INITIAL	100	---	MEGOHMS
	500 HR.	25	---	MEGOHMS
VIBRATIONAL NOISE OUTPUT VOLTAGE, RMS:				
Ef =6.3 V., Ebb = 100 V., Rk = 1500 OHMS				
(BY-PASSED), R_L = 10,000 OHMS,				
VIBRATIONAL ACCELERATION =15 G AT 40cps	INITIAL	---	25	MV.
GRID EMISSION CURRENT:				
Ef = 7.5 V., Eb =100 V., Ecc =-2.5 V.,				
Rg =1.0 MEG.	INITIAL	---	0.3	μAMPS.

THE INDICATED 500-HOUR VALUES ARE LIFE-TEST END POINTS FOR THE FOLLOWING CONDITIONS OF OPERATION: Ef=6.3 VOLTS, Eb=150 VOLTS, Rk=680 OHMS, Rg=1.0 MEG, Ehk=200 VOLTS WITH HEATER POSITIVE WITH RESPECT TO CATHODE, AND BULB TEMPERATURE =220 C MINIMUM.

SPECIAL TESTS AND RATINGS

STABILITY LIFE TEST
STATISTICAL SAMPLE OPERATED FOR ONE HOUR TO EVALUATE AND CONTROL INITIAL VARIATIONS IN TRANSCONDUCTANCE.

SURVIVAL RATE LIFE TEST
STATISTICAL SAMPLE OPERATED FOR ONE HUNDRED HOURS TO EVALUATE AND CONTROL EARLY-LIFE ELECTRICAL AND MECHANICAL INOPERATIVES.

HEATER-CYCLING LIFE TEST
STATISTICAL SAMPLE OPERATED FOR 2000 CYCLES TO EVALUATE AND CONTROL HEATER-CATHODE DEFECTS. CONDITIONS OF TEST INCLUDE Ef=7.0 VOLTS CYCLED FOR ONE MINUTE ON AND FOUR MINUTES OFF, Eb=Ec=0 VOLTS, AND Ehk=140 VOLTS RMS.

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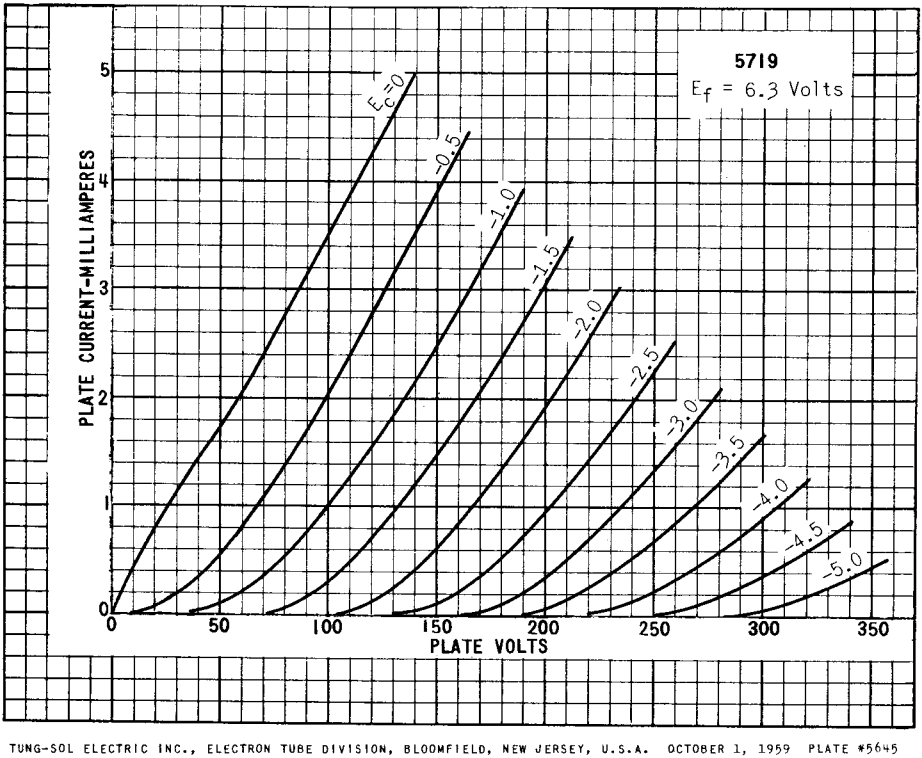
SPECIAL TESTS AND RATINGS - cont'd.

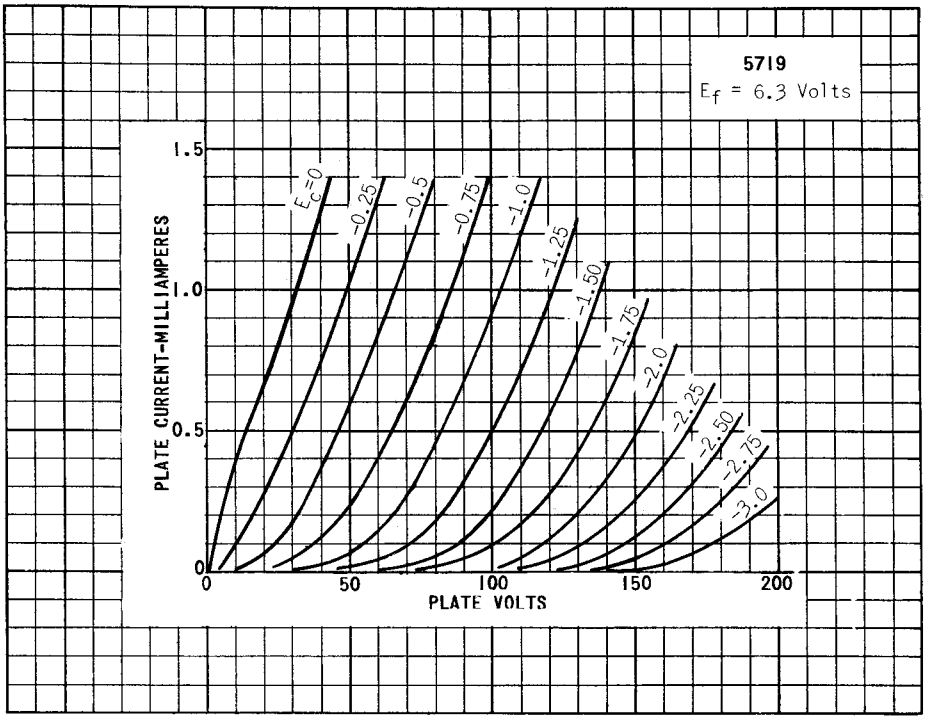
SHOCK RATING--450 G
STATISTICAL SAMPLE SUBJECTED TO FIVE IMPACT ACCELERATIONS OF 450 G IN EACH OF FOUR DIFFERENT POSITIONS. THE ACCELERATING FORCES ARE APPLIED BY THE NAVY-TYPE, HIGH IMPACT (FLYWEIGHT) SHOCK MACHINE FOR ELECTRONIC DEVICES OR ITS EQUIVALENT.

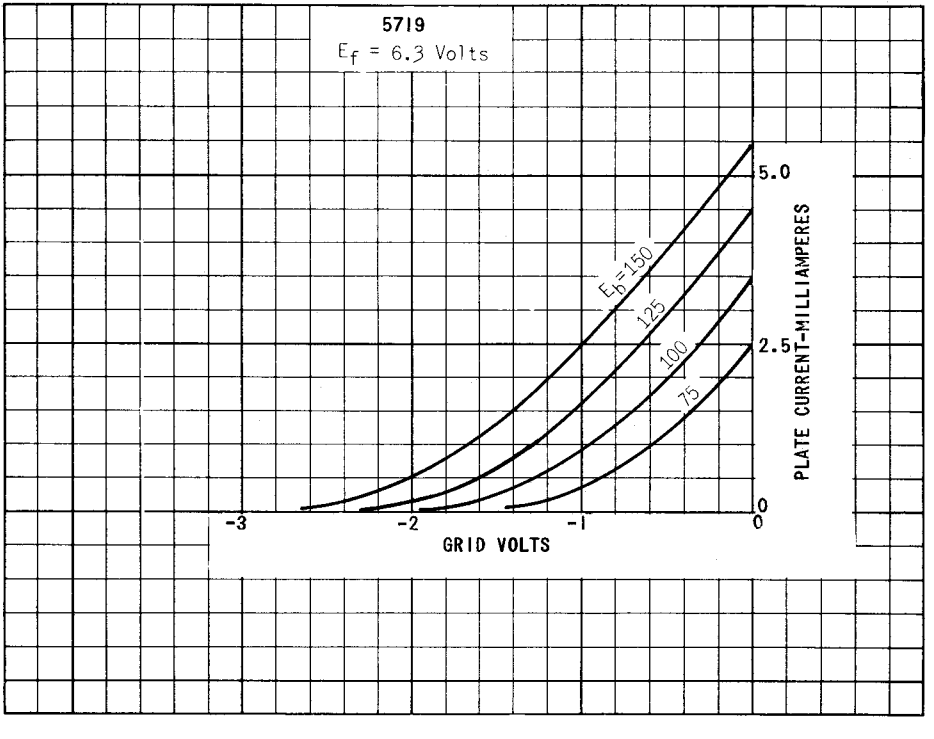
FATIGUE RATING--2.5 G
STATISTICAL SAMPLE SUBJECTED TO VIBRATIONAL ACCELERATION OF 2.5 G FOR 32 HOURS MINIMUM IN EACH OF THREE DIFFERENT POSITIONS. THE SINUSOIDAL VIBRATION IS APPLIED AT A FIXED FREQUENCY BETWEEN 25 AND 60 CYCLES PER SECOND.

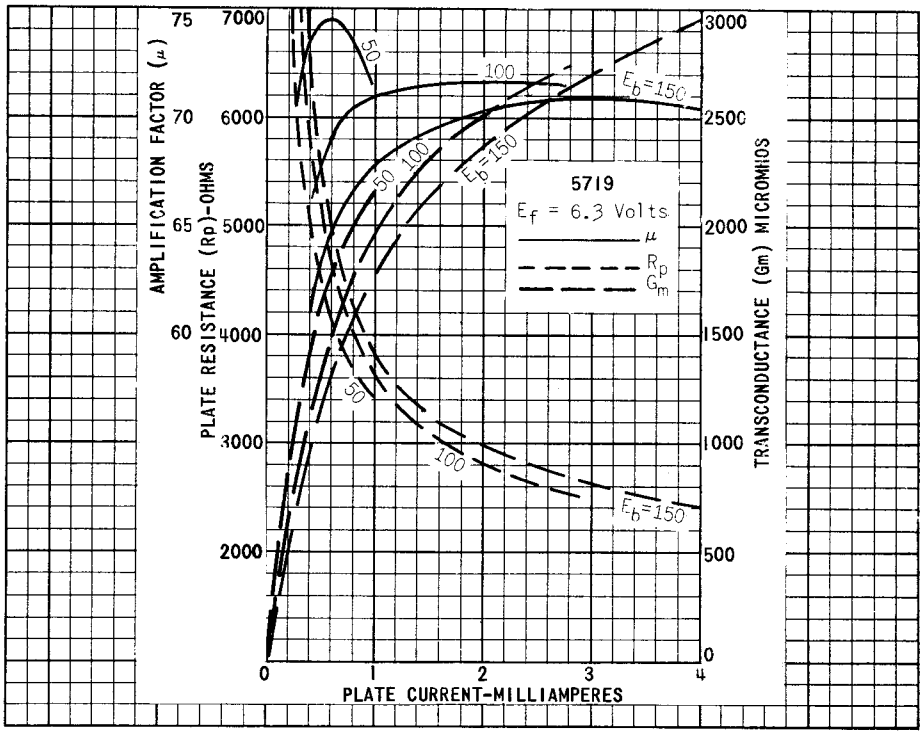
ALTITUDE RATING--60,000 FEET
STATISTICAL SAMPLE SUBJECTED TO PRESSURE OF 55 MILLIMETERS OF MERCURY TO EVALUATE AND CONTROL ARCING AND CORONA.

NOTE;
THE CONDITIONS FOR SOME OF THE INDICATED TESTS HAVE DELIBERATELY BEEN SELECTED TO AGGRAVATE TUBE FAILURES FOR TEST AND EVALUATION PURPOSES. IN NO SENSE SHOULD THESE CONDITIONS BE INTERPRETED AS SUITABLE CIRCUIT OPERATING CONDITIONS.
IN THE DESIGN OF MILITARY EQUIPMENT EMPLOYING THIS TUBE, REFERENCE SHOULD BE MADE TO THE APPROPRIATE MIL-E-1 SPECIFICATION.




5719
E_f = 6.3 Volts
PLATE CURRENT-MILLIAMPERES
1.5
1.0
0.5
0
E_c=0
-0.25
-0.5
-0.75
-1.0
-1.25
-1.50
-1.75
-2.0
-2.25
-2.50
-2.75
-3.0
0
50
100
150
200
PLATE VOLTS


5719
E_f = 6.3 Volts
E_b=150
125
100
75
5.0
2.5
0
PLATE CURRENT-MILLIAMPERES
-3
-2
-1
0
GRID VOLTS


AMPLIFICATION FACTOR (μ)
PLATE RESISTANCE (Rp)-OHMS
TRANSCONDUCTANCE (Gm) MICROMHOS
PLATE CURRENT-MILLIAMPERES
5719
Ef = 6.3 Volts
μ
Rp
Gm
50
100
Eb=150
75
70
65
60
7000
6000
5000
4000
3000
2000
3000
2500
2000
1500
1000
500
0
0
1
2
3
4