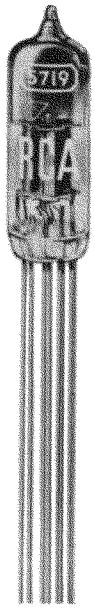
5719

HIGH-MU TRIODE

"Premium" Subminiature Type

TENTATIVE DATA

RCA-5719 is a high-mu subminiature triode of the heater-cathode type designed primarily for use as an audio amplifier in mobile and aircraft receivers where dependable performance under shock and vibration is a prime consideration. In audio service as a resistance-coupled amplifier, it is capable of providing high voltage gain.



Actual Size

The 5719 features a pure-tungsten heater to give long life under conditions of frequent on-off switching, and a compact design in which special attention has been given to structural details which provide increased mount strength against shock and vibration and reduced microphonic output. In addition, each tube is manufactured under rigid controls and undergoes rigorous tests to insure long and dependable performance.

The 5719 supersedes the 5898.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ±5%	volts
Current	0.150	ampere
Direct Interelectrode Capacitances:		

	With External Shield[o]	*Without External Shield*	
Grid to Plate	0.8	0.8	μμf
Input	1.9	1.7	μμf
Output	2.2	0.6	μμf

[o] Having inside diameter of 0.405" and connected to cathode.

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	100	150	volts
Cathode Resistor	1500	680	ohms
Amplification Factor	70	70	
Plate Resistance	41000	30500	ohms
Transconductance	1700	2300	μmhos
Plate Current	0.73	1.85	ma
Grid Volts (Approx.) for plate current of 10 μamp	-2.5	-3.8	volts

Mechanical:

Operating Position	Any
Maximum Bulb Length	1-3/8"
Length from Button Seal to Bulb Top (Excluding tip)	1.075" ± 0.060"
Diameter	0.383" ± 0.017"
Bulb	T-3
Leads, Flexible	8
Length	1-1/2" to 1-3/4"
Orientation and Diameter	See Dimensional Outline

AMPLIFIER - Class A_1

Maximum Ratings, *Absolute Values*:

PLATE VOLTAGE	165 max.	volts
GRID VOLTAGE	-55 max.	volts
PLATE CURRENT	3.3 max.	ma
PLATE DISSIPATION	0.55 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250 max.	°C

Typical Operation as Resistance-Coupled Amplifier:

See Chart on Page 2

Maximum Circuit Values:

Grid-Circuit Resistance:		
For cathode-bias operation	1.2 max.	megohms
For fixed-bias operation	Not recommended	

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	*Min.*	*Max.*	
Heater Current	1	0.138	0.162	amp
Grid-to-Plate Capacitance	2	0.6	1.0	μμf
Input Capacitance	2	1.2	2.2	μμf
Output Capacitance	2	0.4	0.8	μμf
Amplification Factor	1,3	60	80	
Plate Current	1,3	0.5	0.9	ma
Plate Current	1,4	-	50	μamp
Transconductance	1,3	1400	2000	μmhos
Transconductance	5,3	1300	-	μmhos
Grid Current	1,6	-	±0.3	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,7	-	7.0	μamp
Heater positive with respect to cathode	1,7	-	7.0	μamp
Leakage Resistance:				
Between Grid and All Other Electrodes Tied Together	1,8	100	-	megohms
Between Plate and All Other Electrodes Tied Together	1,9	100	-	megohms

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Note 1: With 6.3 volts ac or dc on heater.

Note 2: Without external shield.

Note 3: With plate supply voltage of 100 volts, cathode resistor of 150 ohms, and cathode bypass capacitor of 1000 microfarads.

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TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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Note 4: With dc plate voltage of 100 volts, and dc grid voltage of −2.5 volts.

Note 5: With 5.7 volts ac or dc on heater.

Note 6: With plate supply voltage of 100 volts, cathode resistor of 1500 ohms, cathode bypass capacitor of 1000 microfarads and grid resistor of 0.1 megohm.

Note 7: With 100 volts dc between heater and cathode.

Note 8: With grid 100 volts negative with respect to all other electrodes tied together.

Note 9: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration. . . . . 450 max. g
Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration . . . . . 2.5 max. g
Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Uniform Acceleration Rating: . . . . . 1000 max. g
Tubes are subjected in each of three positions to a gradually applied uniform acceleration up to 1000 g.

Low-Frequency Vibration Performance:

RMS Output Voltage . . . . . 25 max. mv
Under the following conditions: A 150-volt plate voltage supply having an impedance not exceeding that of a 40 μf capacitor, plate load resistance of 10000 ohms, grid resistor of 0.1 megohm, cathode resistor of 1500 ohms, cathode bypass capacitor of 1000 μf, and vibrational acceleration of 15 g at 40 cps.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation . . 2500 min. cycles
Under the following conditions: With heater voltage of 7.0 volts cycled 1 minute on and 4 minutes off, heater-cathode voltage of 140 volts (rms), and plate and grid voltage = 0 volts.

Average Life Performance:

The average life performance based on a 500-hour test at 175°C ambient temperature is not less than 450 hours. This life test is made on sample lot of tubes with heater voltage of 6.3 volts; plate supply voltage of 100 volts; dc heater-cathode voltage (heater positive with respect to cathode) of 200 volts; cathode resistor of 1500 ohms; and grid resistor of 1 megohm.

The 500-hour end-point limits for the 5719 with heater voltage of 6.3 volts, plate supply voltage of 100 volts, cathode resistor of 680 ohms bypassed by capacitor having a maximum reactance of 3 ohms, and dc heater-cathode voltage of 100 volts with heater either positive or negative with respect to cathode are: transconductance, 1000 micromhos minimum; heater-cathode leakage current, 20 microamperes maximum; and grid current, +0.9 microampere maximum or −0.9 microampere maximum.

OPERATING CONDITIONS AS RESISTANCE-COUPLED AMPLIFIER

Cathode-Bias Operation

Plate Supply Voltage	100						200						volts
Plate Load Resistor	0.1	0.1	0.27	0.27	0.47	0.47	0.1	0.1	0.27	0.27	0.47	0.47	megohm
Grid Resistor (of following stage)	0.27	0.47	0.47	1.0	0.47	1.0	0.27	0.47	0.47	1.0	0.47	1.0	megohm
Cathode Resistor	2700	2700	5600	6800	10000	10000	1500	1800	3300	3900	5600	6800	ohms
Signal Input Volts (rms)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	volt
Output Volts (rms)	3.7	3.9	4.1	4.2	3.95	4.3	4.4	4.6	4.9	5.0	4.8	5.0	volts
Gain▲	37	39	41	42	39.5	43	44	46	49	50	48	50	
Distortion	2.4	2.1	2.1	1.8	2.4	1.7	0.7	0.7	0.9	0.7	0.9	0.7	per cent
Signal Input Volts (rms)*	0.20	0.20	0.20	0.26	0.20	0.25	0.51	0.61	0.50	0.59	0.49	0.64	volt
Output Volts (rms)	7.3	7.7	8.1	10.7	7.8	10.7	22	27	24.2	29	23.2	31.6	volts
Gain▲	36.5	38.5	40.5	41.2	39	42.8	43.1	44.3	48.4	49.2	47.3	49.4	
Distortion	5.0	4.5	4.3	4.9	5.0	4.5	3.9	5.0	4.5	4.5	5.0	5.0	per cent

Zero-Bias Operation

Plate-Supply Voltage	100						200						volts
Plate Load Resistor	0.1	0.1	0.27	0.27	0.47	0.47	0.1	0.1	0.27	0.27	0.47	0.47	megohm
Grid Resistor (of following stage)	0.27	0.47	0.47	1.0	0.47	1.0	0.27	0.47	0.47	1.0	0.47	1.0	megohm
Signal Input Volts (rms)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	volt
Output Volts (rms)	3.8	4.0	4.3	4.55	4.2	4.55	4.7	4.9	5.35	5.4	5.2	5.4	volts
Gain▲	38	40	43	45.5	42	45.5	47	49	53.5	54	52	54	
Distortion	2.2	2.0	1.9	1.6	2.1	1.6	0.4	0.4	0.8	0.7	0.9	0.7	per cent
Signal Input Volts (rms)*	0.2	0.21	0.22	0.26	0.2	0.27	0.59	0.63	0.54	0.65	0.5	0.63	volt
Output Volts (rms)	7.25	7.9	8.95	11	7.9	11.3	25	27.7	25.8	31.5	23.5	30.5	volts
Gain▲	36.2	37.6	40.6	42.4	39.5	41.8	42.4	43.9	47.7	48.5	47	48.4	
Distortion	5.0	4.8	4.9	4.8	4.8	5.0	4.9	5.0	4.9	5.0	5.0	4.8	per cent

Note 1: Coupling capacitors should be selected to give desired frequency response. Cathode resistor should be adequately bypassed.

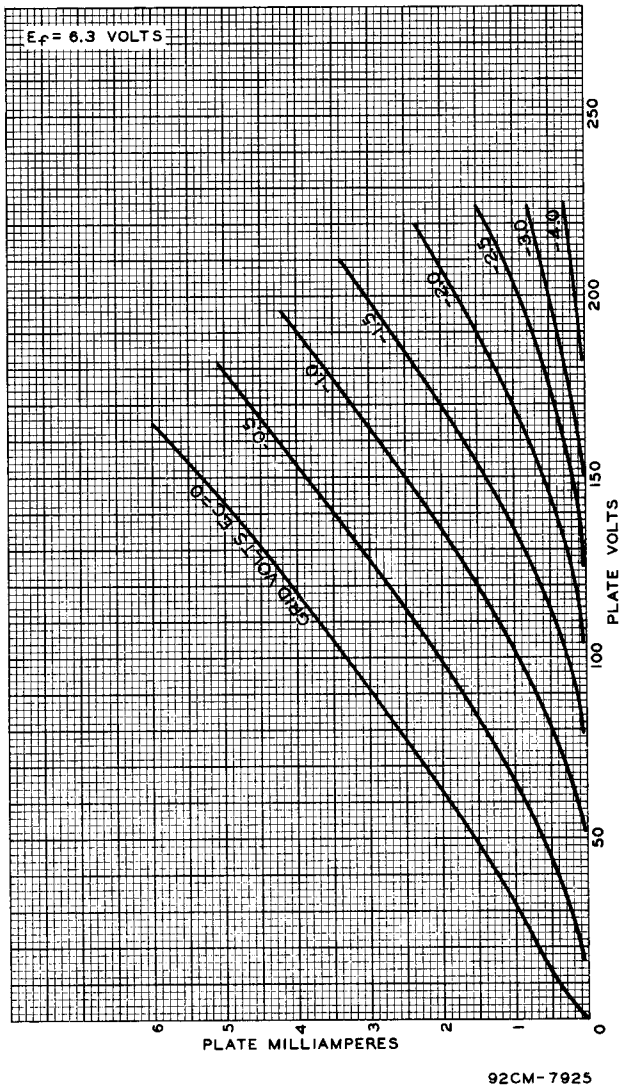
* Maximum value to swing the grid of resistance-coupled amplifier tube to the point where its grid starts to draw current.

▲ Ratio of signal output to signal input.

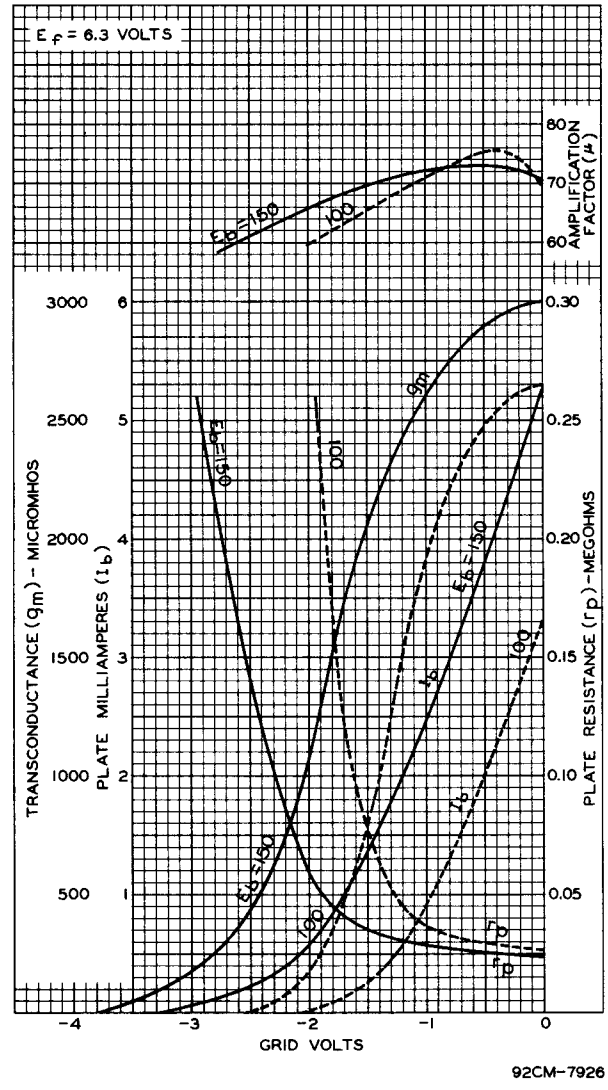
OPERATING NOTES

The *maximum ratings* in the tabulated data for the 5719 are limiting values above which the serviceability of the 5719 may be impaired from the viewpoint of life and satisfactory performance. Therefore, in order not to exceed these absolute ratings, the equipment designer has the responsibility of determining an average design value for each rating below the absolute value of that rating by an amount such that the absolute values will never be exceeded under any usual condition of supply-voltage variation, load variation, or manufacturing variation in the equipment itself.

The *heater supply* should be well regulated because life and reliability of the 5719 are adversely affected by departures from the 6.3-volt value. The extent to which life is affected is a function of the amounts of these departures and their durations.



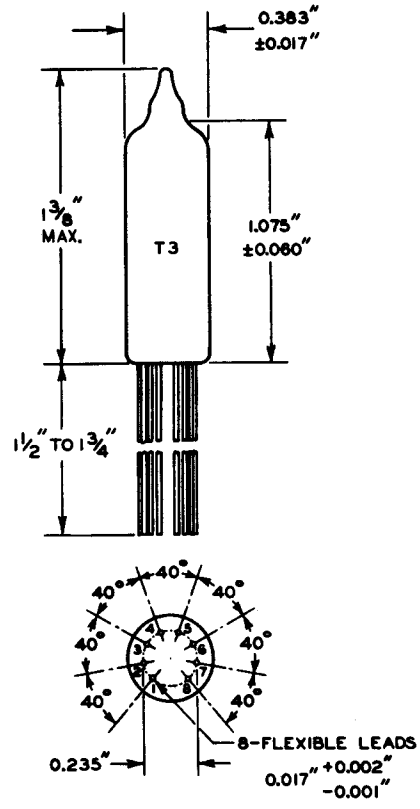
Average Plate Characteristics of Type 5719.



Average Characteristics of Type 5719.

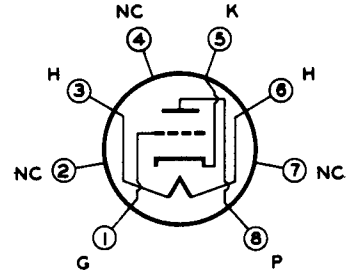
The *flexible leads* of the 5719 are usually soldered to the circuit elements. Soldering of the connections should be made as far as possible from the glass button. If this precaution is not followed, the heat of the soldering may crack the glass seals of the leads and damage the tube.

DIMENSIONAL OUTLINE



FLEXIBLE LEAD CONNECTIONS

LEAD NO. 1: GRID
LEAD NO. 2: NO CONNECTION
LEAD NO. 3: HEATER
LEAD NO. 4: NO CONNECTION



LEAD NO. 5: CATHODE
LEAD NO. 6: HEATER
LEAD NO. 7: NO CONNECTION
LEAD NO. 8: PLATE

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