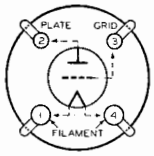
RCA Cunningham Radiotron RADIO TUBES

Type 2A3



BOTTOM VIEW

POWER AMPLIFIER TRIODE

The 2A3 is a three-electrode, high-vacuum type of power amplifier tube for use in the power-output stage of a-c operated receivers. The exceptionally large power-handling ability of the 2A3 is the result of its design features. Among these are its extremely high mutual conductance and its highly efficient cathode which is composed of a large number of coated filaments arranged in series-parallel. This unusual feature provides a very large effective cathode area and thus makes possible the desirable characteristics of the 2A3.

CHARACTERISTICS

Filament Voltage (A. C. or D. C.)	2.5	Volts
Filament Current	2.5	Amperes
Grid-Plate Capacitance	13	μμf
Grid-Filament Capacitance	9	μμf
Plate-Filament Capacitance	4	μμf
Bulb (For dimensions, see Page 151, Fig. 13)		ST-16
Base		Medium 4-Pin

As Single-Tube Class A Amplifier

Filament Voltage (A. C.)	2.5	Volts
Plate Voltage	250 *max.*	Volts
Grid Voltage*	−45	Volts
Plate Current	60	Milliamperes
Plate Resistance	800	Ohms
Amplification Factor	4.2	
Mutual Conductance	5250	Micromhos
Load Resistance	2500	Ohms
Self-Bias Resistor	750	Ohms
Undistorted Power Output	3.5	Watts

As Push-Pull Class AB Amplifier (Two Tubes)

	Fixed-Bias	*Self-Bias*	
Filament Voltage (A. C.)	2.5	2.5	Volts
Plate Voltage (Maximum)	300	300	Volts
Grid Voltage*	−62	−62	Volts
Self-Bias Resistor	—	750	Ohms
Plate Current (Per tube)	40	40	Milliamperes
Load Resistance (Plate-to-plate)	3000	5000	Ohms
Total Harmonic Distortion	2.5	5	Per cent
Power Output	15	10	Watts

* Grid volts measured from mid-point of a-c operated filament.

INSTALLATION

The **base** pins of the 2A3 fit the standard four-contact socket which may be installed to hold the tube either in a vertical or in a horizontal position. For horizontal operation, the socket should be positioned with the filament-pin openings one vertically above the other. Sufficient ventilation should be provided to prevent overheating.

APPLICATION

As a **power amplifier (Class A),** the 2A3 is usable either singly or in push-pull combination in the power-output stage of a-c receivers. Recommended operating conditions are given under CHARACTERISTICS.

The values recommended for push-pull operation are different than the conventional ones usually given on the basis of characteristics for a single tube. The values shown for Push-Pull Class AB operation cover operation with fixed-bias and with self-bias, and have been determined on the basis of no grid current flow during the most positive swing of the input signal and of cancellation of second-harmonic distortion by virtue of the push-pull circuit. The self-bias resistor should preferably be shunted by a suitable filter network to minimize grid-bias variations produced by current surges in the self-bias resistor.

When 2A3's are operated in push-pull, it is desirable to provide means for adjusting independently the bias on each tube. This requirement is a result of the very high mutual conductance of these tubes—5250 micromhos. This very high value makes the 2A3 somewhat critical as to grid-bias voltage, since a very small bias-voltage change produces a very large change in plate current. It is obvious, therefore, that the difference in plate current between two tubes may be sufficient to unbalance the system seriously. To avoid this possibility, simple methods of independent self-bias adjustment may be used, such as (1) input transformer with two independent secondary windings, or (2) filament transformer with two independent filament windings. With either of these methods, each tube can be biased separately so as to obtain circuit balance.

Any conventional type of **input coupling** may be used provided the resistance added to the grid circuit by this device is not too high. *Transformers or impedances are recommended.* When self-bias is used, the d-c resistance in the grid circuit should not exceed 0.5 megohm. With fixed-bias, however, the d-c resistance should not exceed 10000 ohms.

Additional curve information is given on page 35.