RCA-6146B/8298A
BEAM POWER TUBE

Controlled Zero-Bias Plate Current
Controlled Power Output at Reduced Heater Voltage

85 Watts CW Output (ICAS) at 60 Mc
50 Watts CW Output (ICAS) at 175 Mc
RCA "Dark Heater" with 5- to 8-volt Range

3-13/16" Max. Length
1-21/32" Max. Diameter
Octal 8-Pin Base
Small, Sturdy Structure

RCA-6146B/8298A is a small, sturdy, beam power tube having high efficiency and high power sensitivity for use in mobile and stationary equipment. It is rated as an af power amplifier and modulator, a linear rf power amplifier, and a Class C rf power amplifier and oscillator.

The 6146B features a heater designed to operate over a voltage range of 6.0 to 7.5 volts and which will take excursions from 5 to 8 volts in battery operation. The heater design insures dependable performance in mobile equipment under operating conditions during battery charging and discharging. See *Special Performance Data* on page 4 for information covering heater overvoltage and undervoltage operation.

Controlled zero-bias plate current is offered in the 6146B to insure more dependable performance as a Class AB_1 linear rf amplifier for single-sideband suppressed-carrier service. See *Test No.3* of *Characteristics Range Values*.

Also featured in the design of the 6146B is the new RCA "Dark Heater", which functions efficiently at operating temperatures 350° K below those of the heaters in conventional tube types. The dark surface of the new heater radiates heat more efficiently and improves the transfer of heat to the cathode so that optimum cathode temperature may be attained with the heater operating at approximately 1350° K.

The low operating temperature of the "Dark Heater" results in (1) lower internal stresses in the heater wire and smaller thermal change during heater warmup, (2) cooler operation of the heater which minimizes changes in heater shape and reduces the possibility of heater damage and heater shorts, (3) extremely stable heater current characteristics throughout life, and (4) significant reduction in effects of ac heater leakage.

Small in size for its power-output capability, the 6146B has a rugged button-stem construction with short internal leads, a T12 bulb, triple base-pin connections for grid No.3 and cathode (both joined to internal shield inside the tube) to permit effective rf grounding, and an octal base with short metal sleeve having its own base-pin terminal. The sleeve shields the input to the tube and isolates it from the output circuit so completely that no other external shielding is required. Separation of input and output circuits is accomplished by bringing the plate lead out of the bulb to a cap opposite the base.

The 6146B/8298A is unilaterally interchangeable with the 6146, 6146A, and 8298.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current at 6.3 volts	1.125	amp
Minimum heating time	60	sec

See Special Performance Data on page 4 for heater operation in stationary equipment and in mobile equipment.

Transconductance, for plate volts = 200, grid-No.2 volts = 200, and plate ma. = 100	7000	μmhos
Mu-Factor, Grid No.2 to Grid No.1 for plate volts = 200, grid-No.2 volts = 200, and plate ma. = 100	4.5	
Direct Interelectrode Capacitances (Approx.):[a]		
Grid No.1 to plate	0.22 max.	pf
Grid No.1 to cathode & grid No.3 & internal shield, base sleeve, grid No.2, and heater	13	pf
Plate to cathode & grid No.3 & internal shield, base sleeve, grid No.2, and heater	8.5	pf

Mechanical:

Operating Position	Any
Maximum Overall Length	3-13/16"
Seated Length	3-1/8" ± 1/8"
Maximum Diameter	1-21/32"
Bulb	T12
Cap	Small (JEDEC No.C1-1)
Base	Small-Wafer Octal 8-Pin with Sleeve (JEDEC Group 1, No.B8-150), or Small-Wafer Octal 8-Pin with External Barriers and Sleeve (JEDEC Group 1, No.B8-159)
Bulb Temperature (At hottest point)	260 max. °C
Weight (Approx.)	2.3 oz

AF POWER AMPLIFIER & MODULATOR – Class AB_1

Maximum Ratings, *Absolute-Maximum Values:*

	CCS	*ICAS*	
DC PLATE VOLTAGE	600 max.	750 max.	volts
DC GRID-No.2 VOLTAGE	250 max.	250 max.	volts
MAX.-SIGNAL DC PLATE CURRENT[b]	175 max.	220 max.	ma
MAX.-SIGNAL PLATE INPUT[b]	90 max.	120 max.	watts

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Lancaster, Pa.

Trademark(s) ® Registered
Marca(s) Registrada(s)

	CCS	ICAS	
MAX.-SIGNAL GRID-No.2 INPUT[b]	3 max.	3 max.	watts
PLATE DISSIPATION[b]	27 max.	35 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	135 max.	135 max.	volts
Heater positive with respect to cathode	135 max.	135 max.	volts

Typical Operation:

Values are for 2 tubes

DC Plate Voltage	600	750	volts
DC Grid-No.2 Voltage[c]	200	200	volts
DC Grid-No.1 Voltage:			
From fixed-bias source	-47	-48	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage[d]	94	96	volts
Zero-Signal DC Plate Current	48	50	ma
Max.-Signal DC Plate Current	250	250	ma
Max.-Signal DC Grid-No.2 Current	14.8	12.6	ma
Effective Load Resistance (Plate to plate)	5600	7200	ohms
Max.-Signal Driving Power (Approx.)	0	0	watts
Max.-Signal Power Output (Approx.)	96	124	watts

Maximum Circuit Values (CCS or ICAS):

Grid-No.1-Circuit Resistance under Any Condition:[e]

With fixed bias	0.1 max. megohm
With cathode bias	Not recommended

AF POWER AMPLIFIER & MODULATOR – Class AB_2

Maximum Ratings, *Absolute-Maximum Values:*

	CCS	ICAS	
DC PLATE VOLTAGE	600 max.	750 max.	volts
DC GRID-No.2 VOLTAGE	250 max.	250 max.	volts
MAX.-SIGNAL DC PLATE CURRENT[b]	175 max.	220 max.	ma
MAX.-SIGNAL PLATE INPUT[b]	90 max.	120 max.	watts
MAX.-SIGNAL GRID-No.2 INPUT[b]	3 max.	3 max.	watts
PLATE DISSIPATION[b]	27 max.	35 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	135 max.	135 max.	volts
Heater positive with respect to cathode	135 max.	135 max.	volts

Typical CCS Operation:

Values are for 2 tubes

DC Plate Voltage	500	600	volts
DC Grid-No.2 Voltage[c]	200	200	volts
DC Grid-No.1 Voltage:			
From fixed-bias source	-46	-48	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	108	106	volts
Zero-Signal DC Plate Current	50	40	ma
Max.-Signal DC Plate Current	308	270	ma
Max.-Signal DC Grid-No.2 Current	26	27	ma
Max.-Signal DC Grid-No.1 Current	2.7	1.3	ma
Effective Load Resistance (Plate to plate)	3620	5200	ohms
Max.-Signal Driving Power (Approx.)[f]	0.2	0.7	watt
Max.-Signal Power Output (Approx.)	100	110	watts

Typical ICAS Operation:

Values are for 2 tubes

DC Plate Voltage	600	750	volts
DC Grid-No.2 Voltage[c]	200	150	volts
DC Grid-No.1 Voltage:			
From fixed-bias source	-47	-39	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	114	110	volts
Zero-Signal DC Plate Current	50	40	ma
Max.-Signal DC Plate Current	328	294	ma
Max.-Signal DC Grid-No.2 Current	26	28	ma
Max.-Signal DC Grid-No.1 Current	3.4	7.6	ma
Effective Load Resistance (Plate to plate)	4160	6050	ohms
Max.-Signal Driving Power (Approx.)[f]	0.2	0.5	watt
Max.-Signal Power Output (Approx.)	130	148	watts

Maximum Circuit Values (CCS or ICAS):

Grid-No.1-Circuit Resistance:[g]

With fixed bias	30,000 max. ohms
With cathode bias	Not recommended

LINEAR RF POWER AMPLIFIER, Class AB_1

Single-Sideband Suppressed-Carrier Service

Peak envelope conditions for a signal having a minimum peak-to-average power ratio of 2

	CCS	ICAS	
Maximum CCS Ratings, *Absolute-Maximum Values:*			
DC PLATE VOLTAGE	600 max.	750 max.	volts
DC GRID-No.2 VOLTAGE	250 max.	250 max.	volts
DC PLATE CURRENT AT PEAK OF ENVELOPE	175 max.	220 max.	ma
PLATE DISSIPATION	27 max.	35 max.	watts
GRID-No.2 DISSIPATION	3 max.	3 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	135 max.	135 max.	volts
Heater positive with respect to cathode	135 max.	135 max.	volts

Typical Operation with "Two-Tone Modulation":

	At 30 Mc		
DC Plate Voltage	600	750	volts
DC Grid-No.2 Voltage[h]	200	200	volts
DC Grid-No.1 Voltage[h]	-47	-48	volts
Zero-Signal DC Plate Current	24	25	ma
Effective RF Load Resistance	2800	3600	ohms
DC Plate Current at Peak of Envelope	125	125	ma
Average DC Plate Current	86	86	ma

	CCS	ICAS	
DC Grid-No. 2 Current at Peak of Envelope	7.4	6.3	ma
Average DC Grid-No. 2 Current	5.0	3.9	ma
Distortion Products Level:[i]			
Third order	24	26	db
Fifth order	30	31	db
Useful Power Output (Approx.):			
Average	24.5	30.5	watts
Peak envelope	49	61	watts

Maximum Circuit Values:

Grid-No. 1 Circuit Resistance under Any Condition:		
With fixed bias	30,000 max.	ohms

PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony

Carrier conditions per tube for use with a max. modulation factor of 1.0; at frequencies up to 60 Mc

	CCS	ICAS	
Maximum Ratings, *Absolute-Maximum Values:*			
DC PLATE VOLTAGE	480 max.	600 max.	volts
DC GRID-No. 2 VOLTAGE	250 max.	250 max.	volts
DC GRID-No. 1 VOLTAGE	-150 max.	-150 max.	volts
DC PLATE CURRENT	145 max.	180 max.	ma
DC GRID-No. 1 CURRENT	3.5 max.	4.0 max.	ma
PLATE INPUT	60 max.	85 max.	watts
GRID-No. 2 INPUT	2 max.	2 max.	watts
PLATE DISSIPATION	18 max.	23 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	135 max.	135 max.	volts
Heater positive with respect to cathode	135 max.	135 max.	volts
Typical Operation:			
DC Plate Voltage	475	600	volts
DC Grid-No. 2 Voltage[j]	165	175	volts
DC Grid-No. 1 Voltage[k]	-86	-92	volts
From a grid resistor of	26,000	27,000	ohms
Peak RF Grid-No. 1 Voltage	106	114	volts
DC Plate Current	125	140	ma
DC Grid-No. 2 Current	8.5	9.5	ma
DC Grid-No. 1 Current (Approx.)	3.3	3.4	ma
Driving Power (Approx.)	0.4	0.5	watt
Power Output (Approx.)	42	62	watts

Maximum Circuit Values (CCS or ICAS):

Grid-No. 1-Circuit Resistance[n]	30,000 max.	ohms

RF POWER AMPLIFIER & OSC. — Class C Telegraphy and RF POWER AMPLIFIER — Class C FM Telephony

	CCS	ICAS	
Maximum Ratings, *Absolute-Maximum Values up to 60 Mc:*			
DC PLATE VOLTAGE	600 max.	750 max.	volts
DC GRID-No. 2 VOLTAGE	250 max.	250 max.	volts
DC GRID-No. 1 VOLTAGE	-150 max.	-150 max.	volts
DC PLATE CURRENT	175 max.	220 max.	ma
DC GRID-No. 1 CURRENT	3.5 max.	4.0 max.	ma
PLATE INPUT	90 max.	120 max.	watts
GRID-No. 2 INPUT	3 max.	3 max.	watts
PLATE DISSIPATION	27 max.	35 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	135 max.	135 max.	volts
Heater positive with respect to cathode	135 max.	135 max.	volts
Typical Operation as Amplifier up to 60 Mc:			
DC Plate Voltage	600	750	volts
DC Grid-No. 2 Voltage[l]	200	200	volts
DC Grid-No. 1 Voltage[m]	-70	-77	volts
From a grid-No. 1 resistor of	24,000	28,000	ohms
Peak RF Grid-No. 1 Voltage	90	95	volts
DC Plate Current	150	160	ma
DC Grid-No. 2 Current	10	10	ma
DC Grid-No. 1 Current (Approx.)	2.8	2.7	ma
Driving Power (Approx.)	0.3	0.3	watt
Power Output (Approx.)	63	85	watts

Typical Operation as Amplifier at 175 Mc:

DC Plate Voltage	320	400	435	volts
DC Grid-No. 2 Voltage[l]	210	220	230	volts
DC Grid-No. 1 Voltage[m]	-52	-55	-56	volts
From a grid resistor of	26,000	30,000	24,000	ohms
Peak RF Grid-No. 1 Voltage	65	67	73	volts
DC Plate Current	170	180	210	ma
DC Grid-No. 2 Current	12	12	11	ma
DC Grid-No. 1 Current (Approx.)	2	1.9	2.3	ma
Driving Power (Approx.)	2	2	3	watts
Power Output (Approx.)	29	40	50	watts

Maximum Circuit Values (CCS or ICAS):

Grid-No. 1-Circuit Resistance[n]	30,000 max.	ohms

CHARACTERISTICS RANGE VALUES

	Note	Min.	Max.	
1. Direct Interelectrode Capacitances:				
Grid No. 1 to plate	1	-	0.22	pf
Grid No. 1 to cathode & grid No. 3 & internal shield, base sleeve, grid No. 2, and heater	1	12.0	15.0	pf
Plate to cathode & grid No. 3 & internal shield, base sleeve, grid No. 2, and heater	1	7.3	9.5	pf
2. Plate Current	2	46	94	ma
3. Zero-Bias Plate Current	3	330	-	ma
4. Grid-No. 2 Current	2	-	5.5	ma

Note 1: With no external shield.

Note 2: With heater voltage of 6.75 volts, dc plate voltage of 400 volts, dc grid-No. 2 voltage of 200 volts, and dc grid-No. 1 voltage of -34 volts.

Note 3: With heater voltage of 6.75 volts, dc plate voltage of 100 volts, dc grid-No. 2 voltage of 200 volts, and dc grid-No. 1 voltage of -100 volts. Grid No. 1 is square-wave pulsed at 1000 kc to zero volts. Limit value is peak-pulse current.

SPECIAL PERFORMANCE DATA ON HEATER OPERATION

Stationary Equipment Operation:

Heater, for Unipotential Cathode:

	Min.	Design Center	Max.	
Voltage (AC or DC)[a] . .	-	6.3	-	volts
Current at 6.3 volts. .	1.050	-	1.200	amp
Dynamic Grid-No.2 Current[b]	-	-	15	ma
Useful Power Output[b]. . .	59	-	-	watts

[a] It is recommended that the design-center heater voltage be 6.3 volts; the heater power supply should not fluctuate more than 10% to insure long life.

[b] In a single-tube, self-excited oscillator circuit, and with ac heater voltage of 6.3 volts, dc plate voltage of 600 volts, dc grid-No.2 voltage of 200 volts, grid-No.1 resistor of 24,000 ± 10% ohms, dc plate current of 150 max. ma., dc grid-No.1 current of 2.5 to 3 ma., and frequency of 15 Mc.

Mobile Equipment Operation:

Heater, for Unipotential Cathode:

	Min.	Design Range	Max.	
Voltage (AC or DC)[a] . .	-	6.0-7.5	-	volts
Current at 6.75 volts .	1.100	-	1.230	amp
Dynamic Grid-No.2 Current[b]	-	-	15	ma
Useful Power Output I[b]. .	59			watts
Useful Power Output II. .	See *Note c*			

Overvoltage Heater Life Tests:

Continuous heater life tests are performed periodically on sample lots of tubes with 8 volts on the heater, all other electrodes "floating". Intermittent heater life tests are performed periodically on sample lots of tubes with 11 volts on the heater, a cycle of 1 minute "ON" and 4 minutes "OFF". After 1000 hours of the continuous heater life test and after 48 hours of the intermittent heater life test, the following tests are performed:

With heater voltage of 6.75 volts and ± 100 dc volts between cathode and heater, the heater-cathode leakage current will not exceed 100 microamperes.

With ac or dc heater voltage of 6.75 volts, grid-No.1 volts = -200 and cathode, grid No.2, and plate grounded, the minimum grid-No.1 leakage resistance will be 10 megohms.

With ac or dc heater voltage of 6.75 volts, plate volts = -200, and cathode grid No.1 and grid No.2 grounded, the minimum plate leakage resistance will be 10 megohms.

[a] It is recommended that the heater voltage operate within the range of 6.0 to 7.5 volts and within excursions from 5 to 8 volts in battery operation. See *Useful Power Output Test II* and *Overvoltage Tests*.

[b] In a single-tube, self-excited oscillator circuit, and with ac heater voltage of 6.3 volts, dc plate voltage of 600 volts, dc grid-No.2 voltage of 200 volts, grid-No.1 resistor of 24,000 ± 10% ohms, dc plate current of 150 max. ma., dc grid-No.1 current of 2.5 to 3 ma., and frequency of 15 Mc.

[c] With conditions in note b above, reduce heater voltage to 5 volts. Useful power output will be at least 90% of the power output at heater voltage of 6.3 volts.

Information furnished by RCA is believed to be accurate and reliable. However, no responsibility is assumed by RCA for its use; nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of RCA.

[a] With no external shield.

[b] Averaged over any audio-frequency cycle of sine-wave form.

[c] Obtained preferably from a separate source or from the plate voltage supply with a voltage divider.

[d] The driver stage should be capable of supplying the No. 1 grids of the class AB_1 stage with the specified driving voltage at low distortion.

[e] The type of input coupling network used should not introduce too much resistance in the grid-No. 1 circuit. Transformer or impedance coupling devices are recommended.

[f] Driver stage should be capable of supplying the specified driving power at low distortion to the No. 1 grids of the AB_2 stage.

[g] To minimize distortion, the effective resistance per grid-No. 1 circuit of the AB_2 stage should be held at a low value. For this purpose the use of transformer coupling is recommended. In no case, however, should the total dc grid-No. 1-circuit resistance exceed 30,000 ohms when the tube is operated at maximum ratings. For operation at less than maximum ratings, the dc grid-No. 1-circuit resistance may be as high as 100,000 ohms.

[h] Obtained preferably from a separate, well-regulated source.

[i] Referenced to either of the two tones and without the use of feedback to enhance linearity.

[j] Obtained preferably from a separate source modulated with the plate supply, or from the modulated plate supply through a series resistor.

[k] Obtained from grid-No. 1 resistor or from a combination of grid-No. 1 resistor with either fixed supply or cathode resistor.

[l] Obtained preferably from separate source, or from the plate-supply voltage with a voltage divider, or through a series resistor. A series grid-No. 2 resistor should be used only when the tube is used in a circuit which is not keyed. Grid-No. 2 voltage must not exceed 435 volts under key-up conditions.

[m] Obtained from fixed supply, by grid-No. 1 resistor, by cathode resistor, or by combination methods.

[n] When grid No. 1 is driven positive and the tube is operated at maximum ratings, the total dc grid-No. 1-circuit resistance should not exceed the specified value of 30,000 ohms. If this value is insufficient to provide adequate bias, the additional required bias must be supplied by a cathode resistor or fixed supply. For operation at less than maximum ratings, the dc grid-No. 1-circuit resistance may be as high as 100,000 ohms.

DEFINITIONS

AB_1 - The subscript 1 indicates that grid-No. 1 current does not flow during any part of the input cycle.

AB_2 - The subscript 2 indicates that grid-No. 1 current flows during some part of the input cycle.

CCS - Continuous Commercial Service.

ICAS - Intermittent Commercial and Amateur Service.

Ratings System - The *maximum ratings* in the tabulated data are established in accordance with the following definition of the *Absolute-Maximum Rating System* for rating electron devices.

Absolute-Maximum ratings are limiting values of operating and environmental conditions applicable to any electron device of a specified type as defined by its published data, and should not be exceeded under the worst probable conditions.

The device manufacturer chooses these values to provide acceptable serviceability of the device, taking no responsibility for equipment variations, environment variations, and effects of changes in operating conditions due to variations in device characteristics.

The equipment manufacturer should design so that initially and throughout life no absolute-maximum value for the intended service is exceeded with any device under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in device characteristics.

Two-Tone Modulation - Two-Tone Modulation operation refers to that class of amplifier service in which the input consists of two monofrequency rf signals having equal peak amplitude.

MAXIMUM RATINGS vs. OPERATING FREQUENCY
In Class C Telegraphy Service

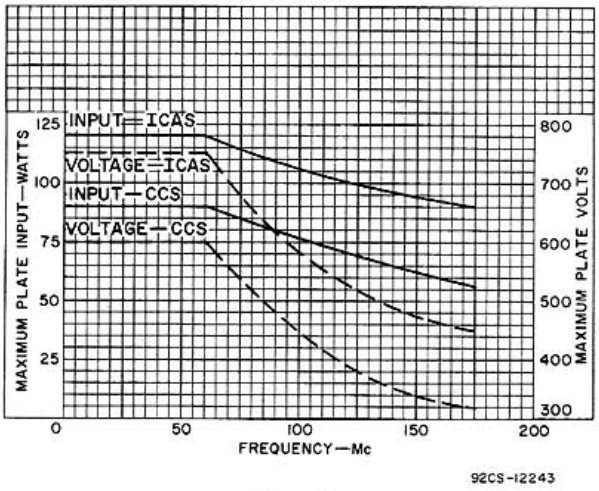


Fig. 1A

MAXIMUM RATINGS vs. OPERATING FREQUENCY
In Class C Telephony Service

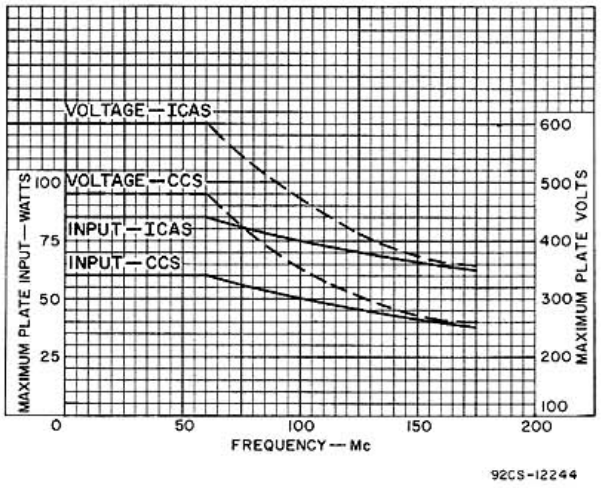


Fig. 1B

GENERAL CONSIDERATIONS

Temperature

The maximum bulb temperature of 260° C is a tube rating and is to be observed in the same manner as other ratings. The temperature may be measured with temperature-sensitive paint, such as Tempilaq. The latter is made by the Tempil Corporation, 132 W. 22nd Street, New York 11, N.Y.

TYPICAL PLATE CHARACTERISTICS

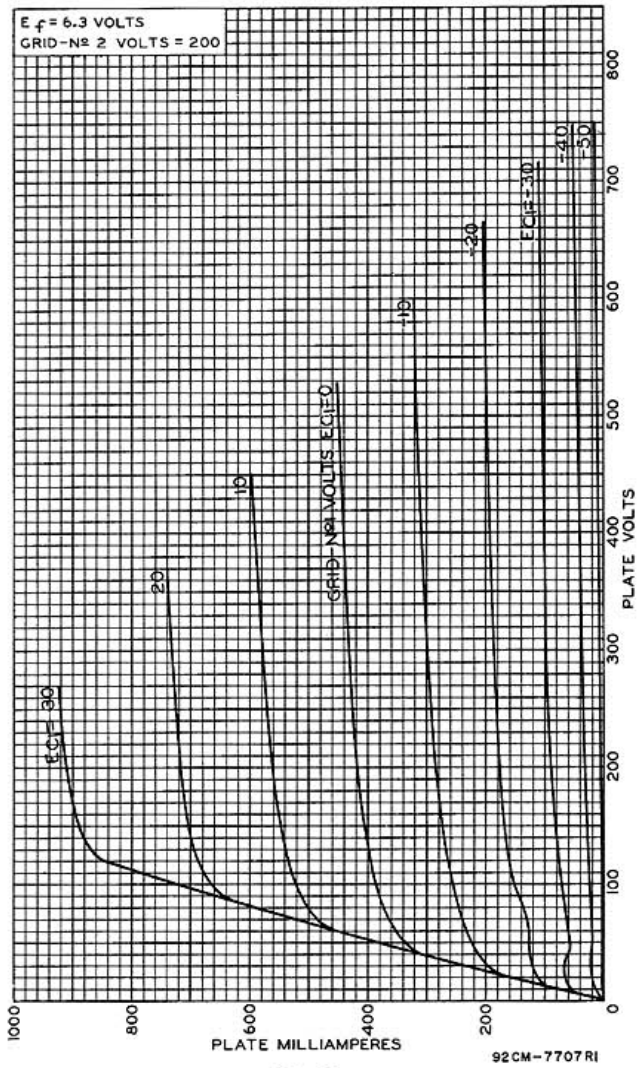


Fig.2

To insure adequate cooling it is essential that free circulation of air be provided around the tube. In most cases, no additional air is required.

Plate Color

The plate shows no color when the 6146B is operated at full ratings under either CCS or ICAS conditions.

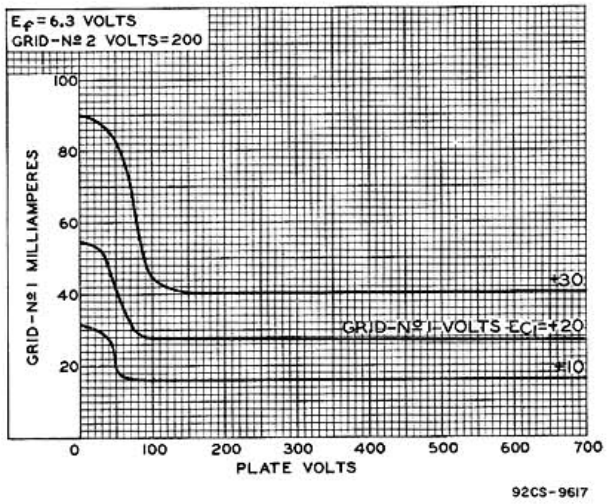
MECHANICAL CONSIDERATIONS

Plate Circuit

Heavy leads and conductors together with suitable insulation should be used in all parts of the rf plate tank circuit so that losses due to rf voltages and currents may be kept at a minimum. At the higher frequencies, it is essential that short, heavy leads be used for circuit connections in order to minimize lead inductance and losses.

Connections to the plate should be made with a flexible lead to prevent any strain on the seal at the cap.

TYPICAL CHARACTERISTICS



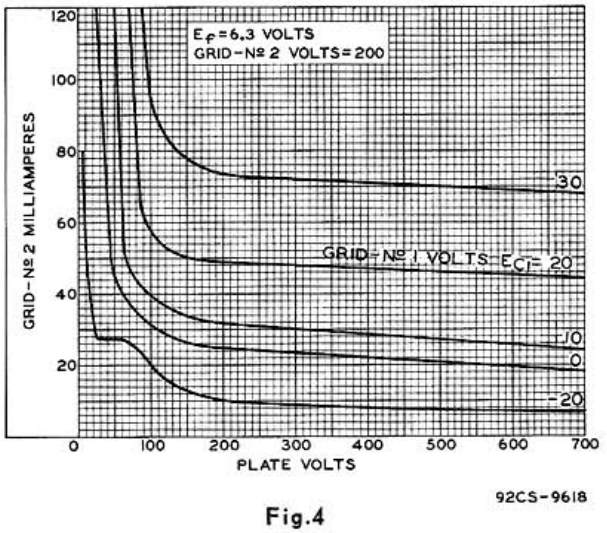


Fig.4

ELECTRICAL CONSIDERATIONS

Plate and Grid No. 2

When a new circuit is tried or when adjustments are made, it is advisable to reduce the

plate voltage and grid-No.2 voltage. If the 6146B is operated at maximum ratings and grid-No.2 voltage is obtained through a series dropping resistor, the use of a 2500-ohm protective resistor in the high-voltage supply lead is recommended. When a separate grid-No.2 voltage supply is used, a 10,000-ohm protective resistor should be connected in the grid-No.2 supply lead.

The grid-No.2 current is a very sensitive indication of plate-circuit loading and grid-No.2 current rises excessively (often to the point of damaging the tube) when the amplifier is operated without load. Therefore, care should be taken when tuning a 6146B under no-load conditions in order to prevent exceeding the grid-No.2 input rating of the tube.

TYPICAL PLATE CHARACTERISTICS

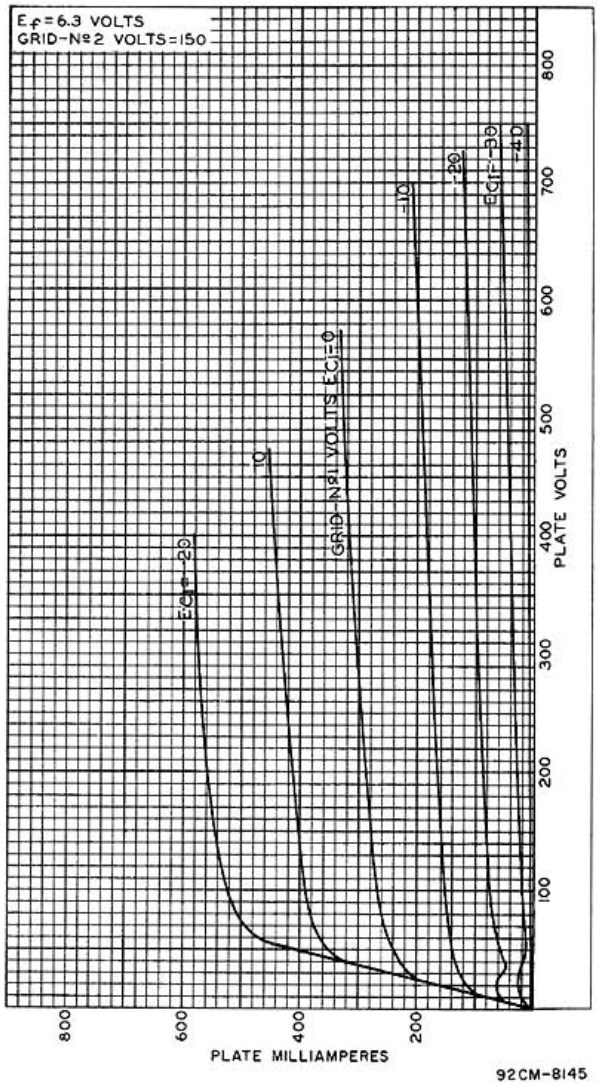


Fig.5

TYPICAL CHARACTERISTICS

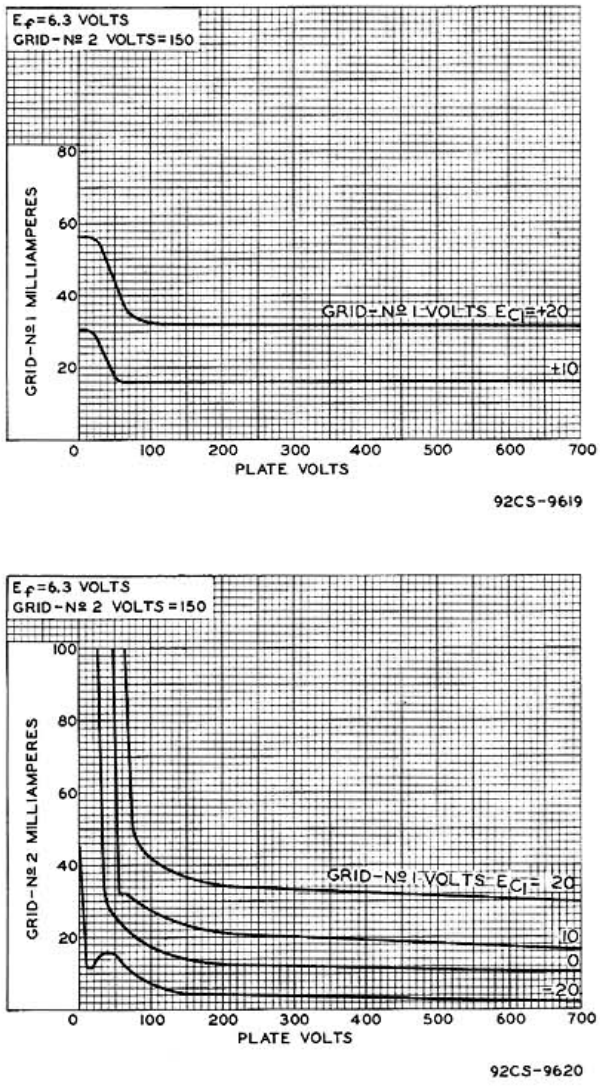


Fig.7

The plate voltage should be applied before or simultaneously with the grid-No.2 voltage; otherwise, with voltage on grid No.2 only, its current may be large enough to cause excessive grid-No.2 dissipation. A dc milliammeter should be used in the grid-No.2 circuit so that its current may be measured and the dc power input determined.

Driver

The driver stage for the 6146B in either class C telephony or telegraphy service should have considerably more output capability than the typical driving power shown in the tabulated data in order to permit considerable range of adjustment, and also to provide for losses in the grid-No.1 circuit and the coupling circuits.

This recommendation is particularly important near the maximum-rated frequency where there are other losses of driving power, such as circuit losses, radiation losses, and transit-time losses.

Efficiency

Highest operating efficiency in high-frequency service, and therefore maximum power output, will be obtained when the 6146B is operated under load conditions such that the maximum rated plate current flows at the plate voltage which will give maximum rated input.

Class C Telephony

In plate-modulated class C amplifier service, the 6146B can be modulated 100 per cent. The grid-No.2 voltage must be modulated simultaneously with the plate voltage so that the ratio of grid-No.2 voltage to plate voltage remains constant. Modulation of the grid-No.2 voltage can be accomplished either by connecting grid No.2 through a separate winding on the modulation transformer to the fixed grid-No.2 voltage supply, or by connecting grid No.2 through an audio-frequency choke of suitable impedance for low audio frequencies to the fixed grid-No.2 supply voltage. The supply end of the choke should be well bypassed to ground.

Circuit Arrangements

Push-pull or parallel circuit arrangements can be used when more radio-frequency power is required than can be obtained from a single 6146B. Two 6146B's in parallel or push-pull will give approximately twice the power output of one tube. The parallel connection requires no increase in exciting voltage necessary to drive a single tube.

With either connection, the driving power required is approximately twice that for a single tube. The push-pull arrangement has the advantage of simplifying the balancing of high-frequency circuits.

When two or more tubes are used in the circuit, precautions should be taken to insure that each tube draws the same plate current.

Standby Operation

During standby periods in intermittent operation, the heater voltage may be maintained at normal operating value for most applications.

In those applications which require maximum reliability, it is recommended that the heater voltage be maintained at normal operating value when the period is less than 15 minutes; that it be reduced to 80 per cent of normal when the period is between 15 minutes and 2 hours; and that for longer periods, the heater voltage should be turned off.

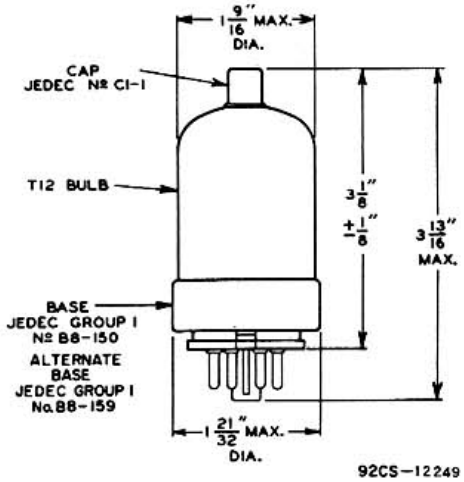
Protective Devices

Protective devices should be used to protect not only the plate but also grid No.2 against overload. In order to prevent excessive plate current flow and resultant overheating of the tube, the common ground lead of the plate circuit should be connected in series with the coil of an instantaneous overload relay. This relay should be adjusted to remove the dc plate and grid-No.2 voltage when the average value of plate current reaches a value slightly higher than normal plate current. A protective device in the grid-No.2 supply should remove the grid-No.2 voltage when the dc grid-No.2 current reaches a value slightly higher than normal.

Precautions

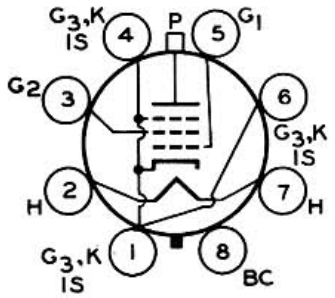
The rated plate and grid-No.2 voltages of this tube are extremely dangerous. Great care should be taken during the adjustment of circuits. The tube and its associated apparatus, especially all parts which may be at high potential above ground, should be housed in a protective enclosure. The protective housing should be designed with interlocks so that personnel can not possibly come in contact with any high-potential point in the electrical system. The interlock devices should function to break the primary circuit of the high-voltage supplies when any gate or door on the protective housing is opened, and should prevent the closing of the primary circuit until the door is again locked.

DIMENSIONAL OUTLINE



TERMINAL CONNECTIONS

Bottom View



7CK

PIN 1: CATHODE, GRID NO.3, INTERNAL SHIELD
PIN 2: HEATER
PIN 3: GRID NO.2
PIN 4: SAME AS PIN 1
PIN 5: GRID NO.1
PIN 6: SAME AS PIN 1
PIN 7: HEATER
PIN 8: BASE SLEEVE
CAP: PLATE