

Beam Power Tube

COAXIAL-ELECTRODE STRUCTURE
 CERAMIC-METAL SEALS
 UNIPOTENTIAL CATHODE

FORCED-AIR COOLED
 INTEGRAL RADIATOR
 180 WATTS CW INPUT UP TO 1215 Mc

For Use at Frequencies up to 2000 Mc

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage (AC or DC) ^a	6.3 ± 10%	volts
Current at heater volts = 6.3	2.1	amp
Minimum heating time.	60	sec

Mu-Factor, Grid No.2 to Grid No.1

for plate volts = 250, grid-No.2 volts = 250, and plate ma = 100	18	
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Direct Interelectrode Capacitances: ^b

Grid No.1 to plate.	0.065 max.	pf
Grid No.1 to cathode & heater	14.0	pf
Plate to cathode & heater	0.015 max.	pf
Grid No.1 to grid No.2.	17.0	pf
Grid No.2 to plate.	4.4	pf
Grid No.2 to cathode & heater	0.4 max.	pf

Mechanical:

Operating Position.	Any
Overall Length.	1.88" ± 0.05" ←
Greatest Diameter	1.250" ± 0.015"
Weight (Approx.).	2 oz
Radiator.	Integral part of tube

Socket:

For use up to about 400 Mc:

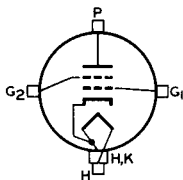
For socket to be used with the 6816 consult manufacturers such as J-V-M Microwave Company, 9300 W. 47th St., Brookfield, Ill., E. F. Johnson Company, Waseca, Minn.; Collins Radio Co., 855 35th St. N., Cedar Rapids, Iowa, and Jettron Products, Route 10, Hanover, N.J.

For use at higher frequencies:

See *Mounting Arrangement*.

Terminal Diagram (See *Dimensional Outline*):

- G₁ - Grid No.1 - Terminal Contact Surface
- G₂ - Grid No.2 - Terminal Contact Surface
- H - Heater - Terminal Contact Surface



- H, K - Heater - & Cathode - Terminal Contact Surface
- P - Plate Terminal Contact Surface

← Indicates a change.



Thermal:

Plate, Grid No.2, Grid No.1,
 Cathode, and Heater Temperature^v. 250 max. °C
 Radiator Core Temperature^v. 250 max. °C
 Air Flow:

Through radiator—Adequate air flow to limit the radiator core temperature to 250° C should be delivered by a blower through the radiator before and during the application of plate, grid-No.2, and grid-No.1 voltages. Typical values of air flow directed through the radiator without cowling and with cowling versus plate dissipation are shown in the accompanying *Typical Cooling Requirements* curves. Plate power, grid-No.2 power, and air flow may be removed simultaneously.

To grid-No.2, grid-No.1, cathode, and heater terminals—A sufficient quantity of air should be delivered to these terminals to prevent their temperature from exceeding the specified maximum value of 250° C.

During standby operation—Cooling air is not normally required when only heater voltage is applied to the tube.

Terminal Temperature (Plate, Grid No.2,
 Grid No.1, Cathode, and Heater) 250 max. °C

AF POWER AMPLIFIER & MODULATOR — Class AB₁^c

Maximum CCS^d Ratings, Absolute-Maximum Values:

DC PLATE VOLTAGE.	1000 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE.	300 max.	volts
MAX.—SIGNAL DC PLATE CURRENT ^e	180 max.	ma
MAX.—SIGNAL PLATE INPUT ^e	180 max.	watts
MAX.—SIGNAL GRID-No.2 INPUT ^e	4.5 max.	watts
PLATE DISSIPATION ^e	115 max.	watts

Typical CCS Operation:

Values are for 2 tubes

DC Plate Voltage.	650	850	volts
DC Grid-No.2 Voltage ^f	300	300	volts
DC Grid-No.1 (Control-Grid) Voltage:			
From fixed-bias source.	-15	-15	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage ^g	30	30	volts
Zero-Signal DC Plate Current.	80	80	ma
Max.—Signal DC Plate Current.	200	200	ma
Zero-Signal DC Grid-No.2 Current.	0	0	ma
Max.—Signal DC Grid-No.2 Current.	20	20	ma
Effective Load Resistance (Plate to plate).	4330	7000	ohms
Max.—Signal Driving Power (Approx.)	0	0	watts
Max.—Signal Power Output (Approx.)	50	80	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance under any condition:^h
 For fixed-bias operation. 30000 max. ohms
 For cathode-bias operation. Not recommended



AF POWER AMPLIFIER & MODULATOR — Class AB₂^jMaximum CCS^d Ratings, Absolute-Maximum Values:

DC PLATE VOLTAGE.	1000 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE.	300 max.	volts
MAX.-SIGNAL DC PLATE CURRENT ^e	180 max.	ma
MAX.-SIGNAL DC GRID-No.1 (CONTROL- GRID) CURRENT ^e	30 max.	ma
MAX.-SIGNAL PLATE INPUT ^e	180 max.	watts
MAX.-SIGNAL GRID-No.2 INPUT ^e	4.5 max.	watts
PLATE DISSIPATION ^e	115 max.	watts

Typical CCS Operation:

Values are for 2 tubes

DC Plate Voltage.	650	850	volts
DC Grid-No.2 Voltage ^f	300	300	volts
DC Grid-No.1 Voltage: From fixed-bias source.	-15	-15	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage.	46	46	volts
Zero-Signal DC Plate Current.	80	80	ma
Max.-Signal DC Plate Current.	355	355	ma
Zero-Signal DC Grid-No.2 Current.	0	0	ma
Max.-Signal DC Grid-No.2 Current.	25	25	ma
Max.-Signal DC Grid-No.1 Current.	15	15	ma
Effective Load Resistance (Plate to plate).	2450	3960	ohms
Max.-Signal Driving Power (Approx.) ^k	0.3	0.3	watt
Max.-Signal Power Output (Approx.).	85	140	watts

LINEAR RF POWER AMPLIFIER

Single-Sideband Suppressed-Carrier Service

Maximum CCS^d Ratings, Absolute-Maximum Values:

Up to 1215 Mc

DC PLATE VOLTAGE.	1000 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE.	300 max.	volts
MAX.-SIGNAL DC PLATE CURRENT.	180 max.	ma
MAX.-SIGNAL DC GRID-No.1 (CONTROL- GRID) CURRENT.	30 max.	ma
MAX.-SIGNAL PLATE INPUT.	180 max.	watts
MAX.-SIGNAL GRID-No.2 INPUT.	4.5 max.	watts
PLATE DISSIPATION.	115 max.	watts

Typical CCS Class AB₁ "Single-Tone" Operation:^m

Up to 60 Mc

DC Plate Voltage.	650	850	volts
DC Grid-No.2 Voltage ^f	300	300	volts
DC Grid-No.1 Voltage.	-15	-15	volts
Zero-Signal DC Plate Current.	40	40	ma
Zero-Signal DC Grid-No.2 Current.	0	0	ma
Effective RF Load Resistance.	2165	3500	ohms
Max.-Signal DC Plate Current.	100	100	ma
Max.-Signal DC Grid-No.2 Current.	10	10	ma
Max.-Signal DC Grid-No.1 Current.	0	0	ma



Max.-Signal Peak RF Grid-No.1 Voltage . . .	15	15	volts
Max.-Signal Driving Power (Approx.)	0	0	watts
Max.-Signal Power Output (Approx.)	25	40	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance under any condition:
 For fixed-bias operation 30000 ohms
 For cathode-bias operation Not recommended

PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony

*Carrier conditions per tube for use
 with a maximum modulation factor of 1*

Maximum CCS^d Ratings, Absolute-Maximum Values:

Up to 1215 Mc

DC PLATE VOLTAGE	800 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-100 max.	volts
DC PLATE CURRENT	150 max.	ma
DC GRID-No.1 CURRENT	30 max.	ma
PLATE INPUT	120 max.	watts
GRID-No.2 INPUT	3 max.	watts
PLATE DISSIPATION	75 max.	watts

Typical CCS Operation:

At 400 Mc

DC Plate Voltage	400	700	volts
DC Grid-No.2 Voltage ⁿ	200	250	volts
DC Grid-No.1 Voltage ^p	-20	-50	volts
DC Plate Current	100	130	ma
DC Grid-No.2 Current	5	10	ma
DC Grid-No.1 Current	5	10	ma
Driver Power Output (Approx.) ^q	2	3	watts
Useful Power Output (Approx.)	16	45	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance
 under any condition 30000^r max. ohms

**RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy^s
 and
 RF POWER AMPLIFIER — Class C FM Telephony**

Maximum CCS^d Ratings, Absolute-Maximum Values:

Up to 1215 Mc

DC PLATE VOLTAGE	1000 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-100 max.	volts
DC PLATE CURRENT	180 max.	ma
DC GRID-No.1 CURRENT	30 max.	ma
PLATE INPUT	180 max.	watts
GRID-No.2 INPUT	4.5 max.	watts
PLATE DISSIPATION	115 max.	watts



Typical CCS Operation:

	At 400 Mc		At 1215 Mc	
DC Plate Voltage.	400	900	900	volts
DC Grid-No.2 Voltage ^t	200	300	300	volts
DC Grid-No.1 Voltage ^u	-35	-30	-22	volts
DC Plate Current.	150	170	170	ma
DC Grid-No.2 Current.	5	1	1	ma
DC Grid-No.1 Current.	3	10	4	ma
Driver Power Output (Approx.) ^q	3	3	5	watts
Useful Power Output (Approx.)	23	80	40	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance
under any condition 30000^r max. ohms

- ^a Because the cathode is subjected to considerable back bombardment as the frequency is increased with resultant increase in temperature, the heater voltage should be reduced depending on operating conditions and frequency to prevent overheating the cathode and resultant short life.
- ^b Measured with special shield adapter.
- ^c Subscript 1 indicates that grid-No.1 current does not flow during any part of the input cycle.
- ^d Continuous Commercial Service.
- ^e Averaged over any audio-frequency cycle of sine-wave form.
- ^f Preferably obtained from a fixed supply.
- ^g The driver stage should be capable of supplying the No.1 grids of the class AB₁ stage with the specified driving voltage at low distortion.
- ^h The resistance introduced into the grid-No.1 circuit by the input coupling should be held to a low value. In no case should it exceed the specified maximum value. Transformer- or impedance-coupling devices are recommended.
- ^j Subscript 2 indicates that grid-No.1 current flows during some part of the input cycle.
- ^k Driver stage should be capable of supplying the specified driving power at low distortion to the No.1 grids of the AB₂ stage. To minimize distortion, the effective resistance per grid-No.1 circuit of the AB₂ stage should be held at a low value. For this purpose, the use of transformer coupling is recommended.
- ^m "Single-Tone" operation refers to that class of amplifier service in which the grid-No.1 input consists of a monofrequency rf signal having constant amplitude. This signal is produced in a single-sideband suppressed-carrier system when a single audio frequency of constant amplitude is applied to the input of the system.
- ⁿ Obtained preferably from a separate source modulated along with the plate supply.
- ^p Obtained from grid-No.1 resistor or from a combination of grid-No.1 resistor with either fixed supply or cathode resistor.
- ^q The driver stage is required to supply tube losses and rf-circuit losses. It should be designed to provide an excess of power above the indicated values to take care of variations in line voltage, in components, in initial tube characteristics, and in tube characteristics during life.
- ^r If this value is insufficient to provide adequate bias, the additional required bias must be supplied by a cathode resistor or fixed supply.
- ^s Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.
- ^t Obtained preferably from a fixed supply, or from the plate-supply voltage with a voltage divider.
- ^u Obtained from fixed supply, by grid-No.1 resistor, by cathode resistor, or by combination methods.
- ^v See *Dimensional Outline* for temperature measurement points.



CHARACTERISTICS RANGE VALUES

	Note	Min.	Max.	
Heater Current	1	1.84	2.26	amp
Direct Interelectrode Capacitances:				
Grid No.1 to plate	2	-	0.065	pf
Grid No.1 to cathode & heater	2	11.8	15.2	pf
Plate to cathode & heater	2	-	0.015	pf
→ Grid No.1 to grid No.2	2	15.9	19.2	pf
Grid No.2 to plate	2	4.0	5.0	pf
Grid No.2 to cathode & heater	2	-	0.40	pf
Grid-No.1 Voltage	1,3	-6	-15	volts
Grid-No.1 Cutoff Voltage	1,4	-	-30	volts
Grid-No.1 Current	1,5	10	-	ma
Reverse Grid-No.1 Current	1,3	-	-20	μa
Grid-No.2 Current	1,3	-8	+2	ma
Peak Emission	1,6	-	400	peak volts
Interelectrode Leakage Resistance	7	1.0	-	megohm
Useful Power Output	8	80	-	watts

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

Note 2: Measured with special shield adapter.

Note 3: With dc plate voltage of 1000 volts, dc grid-No.2 voltage of 300 volts, and dc grid-No.1 voltage adjusted to give a dc plate current of 115 ma.

Note 4: With dc plate voltage of 1000 volts, dc grid-No.2 voltage of 250 volts, and dc grid-No.1 voltage adjusted to give a dc plate current of 1 ma.

Note 5: With plate and grid-No.2 floating and dc grid No.1 voltage of +2 volts.

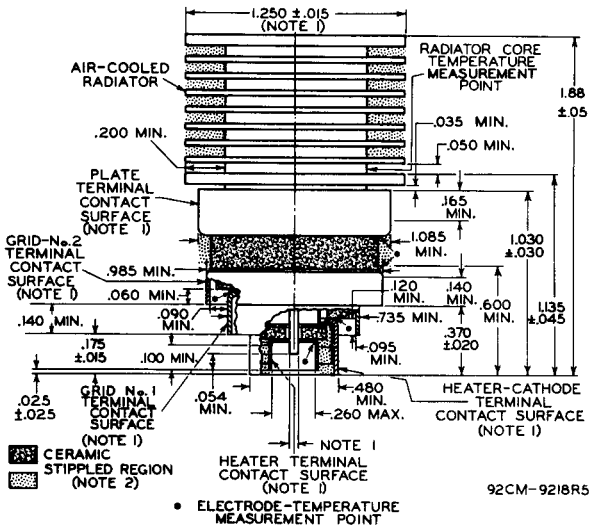
Note 6: For conditions with: grid No.1, grid No.2, and plate tied together; and pulse voltage source connected between plate and cathode. Pulse duration is 2 microseconds, pulse repetition frequency is 60 pps, and duty factor is 0.00012. The voltage-pulse amplitude is adjusted until a peak cathode current of 10 amperes is obtained. After 1 minute at this value, the voltage-pulse amplitude will not exceed 400 volts (peak).

Note 7: Under conditions with tube at 20° to 30° C for at least 30 minutes without any voltages applied to the tube. The minimum resistance between any two adjacent electrodes as measured with a 200-volt Megger-type ohmmeter having an internal impedance of 1 megohm, will be 1 megohm.

→ Note 8: In a single-tube, grid-driven coaxial-cavity class C amplifier circuit at 400 Mc and for conditions with 5.7 volts ac or dc on heater, dc plate voltage of 1000 volts, dc grid-No.2 voltage of 300 volts, grid-No.1 resistor adjustable between 0 and 10000 ohms, dc plate current of 180 ma. maximum, dc grid-No.1 current of 30 ma. maximum, and driver power output of 3 watts.

→ Indicates a change.



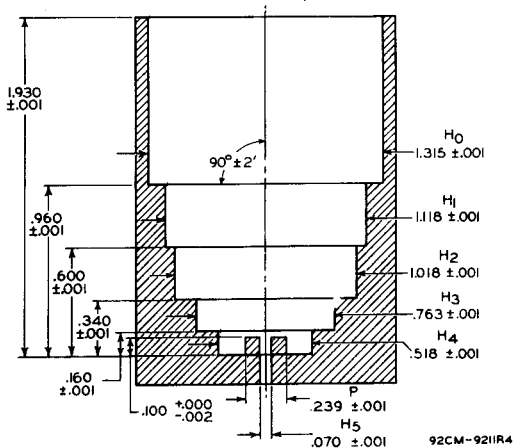


DIMENSIONS IN INCHES

Note 1: With the cylindrical surfaces of the plate terminal, grid-No.2 terminal, grid-No.1 terminal, heater-cathode terminal, and heater terminal clean, smooth, and free of burrs, the tube will enter a gauge as shown in sketch G₁. The tube is properly seated in the gauge when a 0.010" thickness gauge 1/8" wide will not enter between the heater-cathode terminal and the bottom surface of H₄. The gauge is provided with a slot to permit making measurement of seating of heater-cathode terminal on bottom of hole H₄.

Note 2: Keep all stiplled regions clear. Do not allow contacts or circuit components to protrude into these annular volumes.

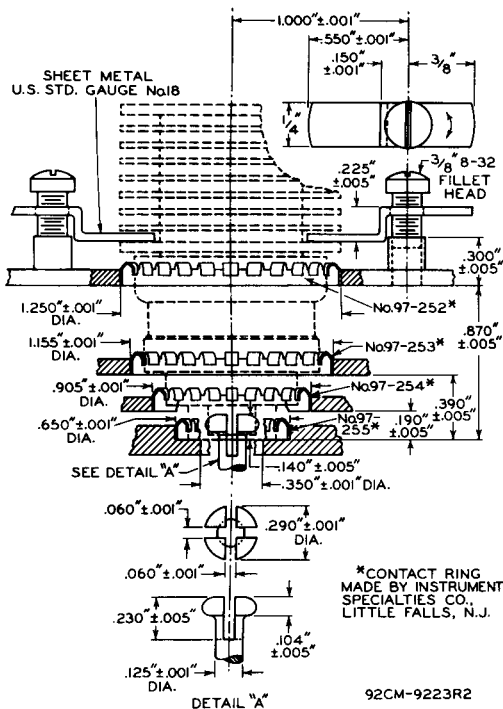


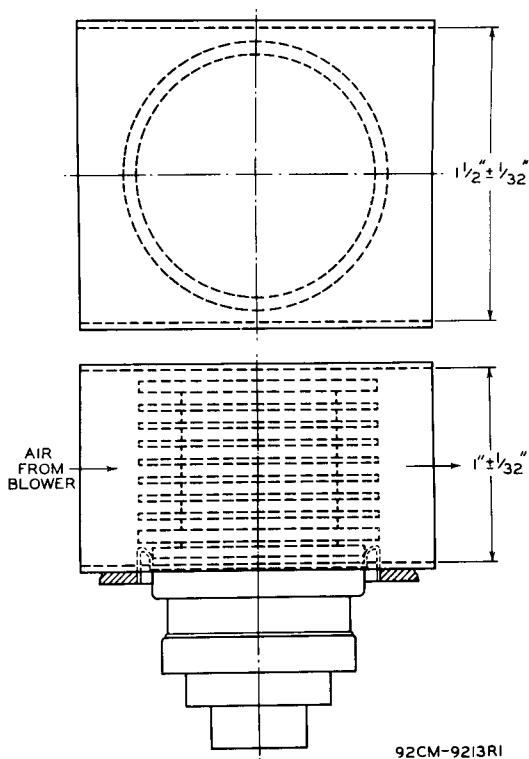
SKETCH G₁

DIMENSIONS IN INCHES

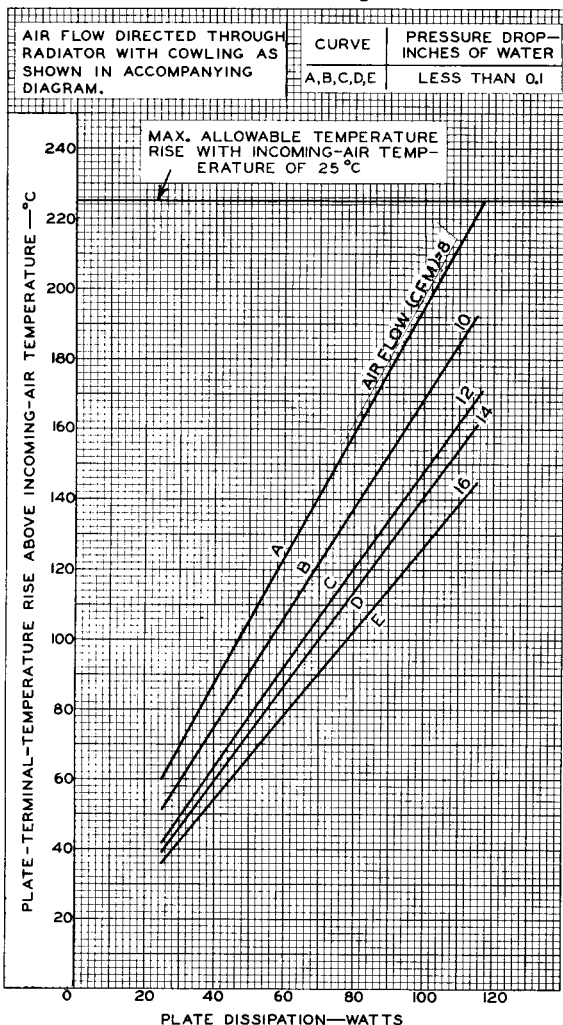
THE AXES OF THE CYLINDRICAL HOLES H₀ THROUGH H₅ AND THE AXIS OF POST P ARE COINCIDENT WITHIN 0.001".

SUGGESTED MOUNTING ARRANGEMENT
& LAYOUT OF ASSOCIATED CONTACTS



RECOMMENDED COWLING
FOR DIRECTING AIR FLOW THROUGH RADIATOR

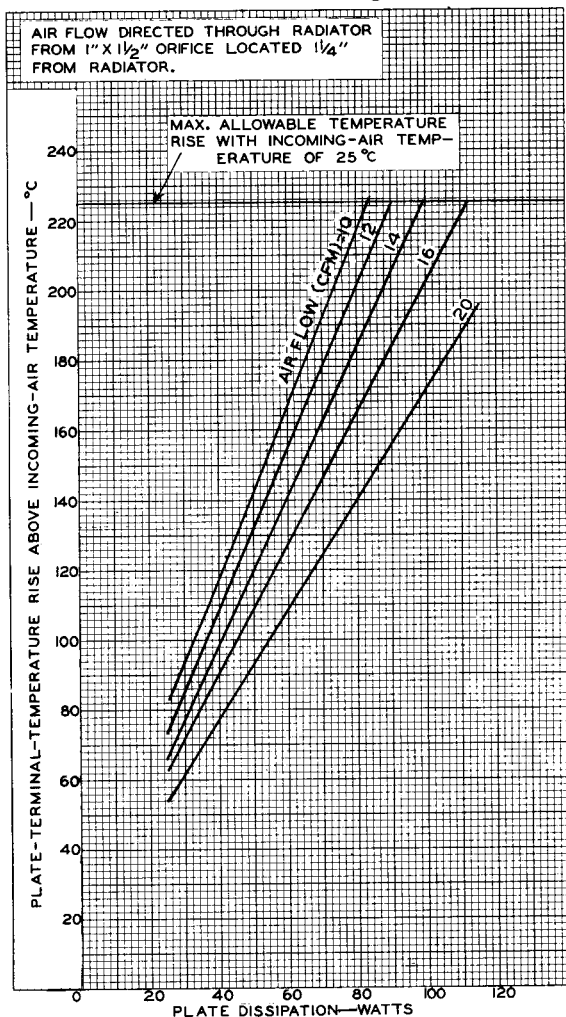
TYPICAL COOLING REQUIREMENTS With Cowling



92CM-9219RI



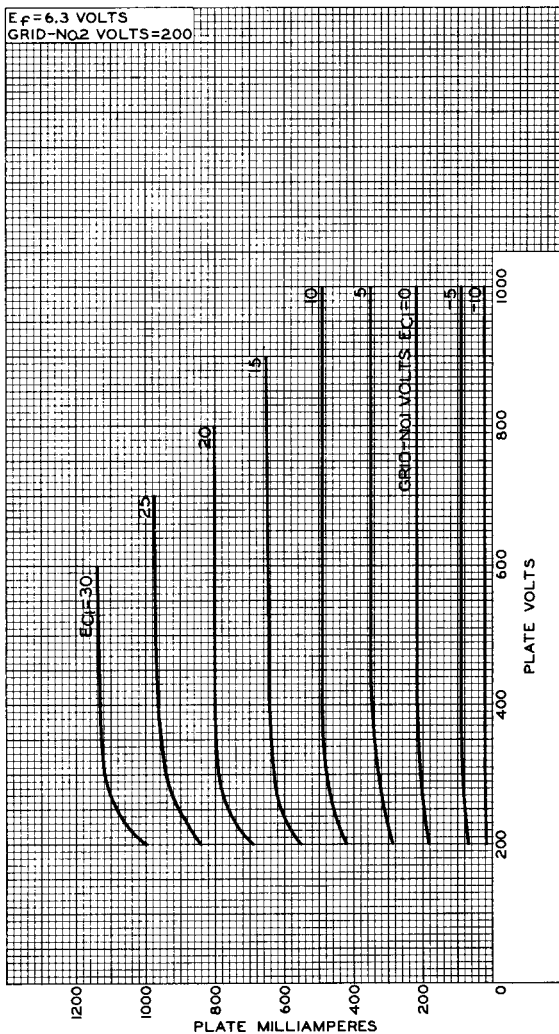
TYPICAL COOLING REQUIREMENTS Without Cowling



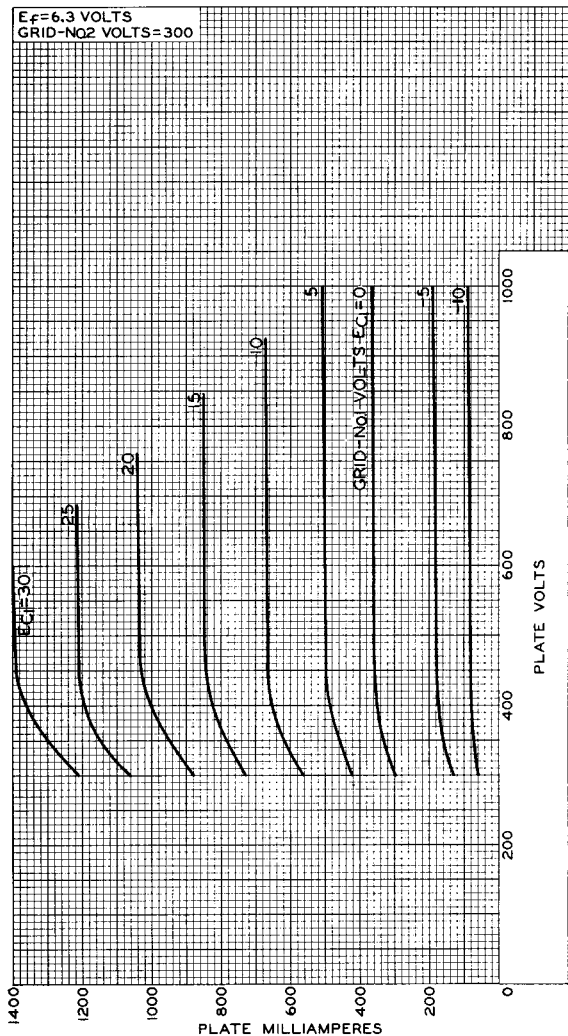
92CM-9220R1



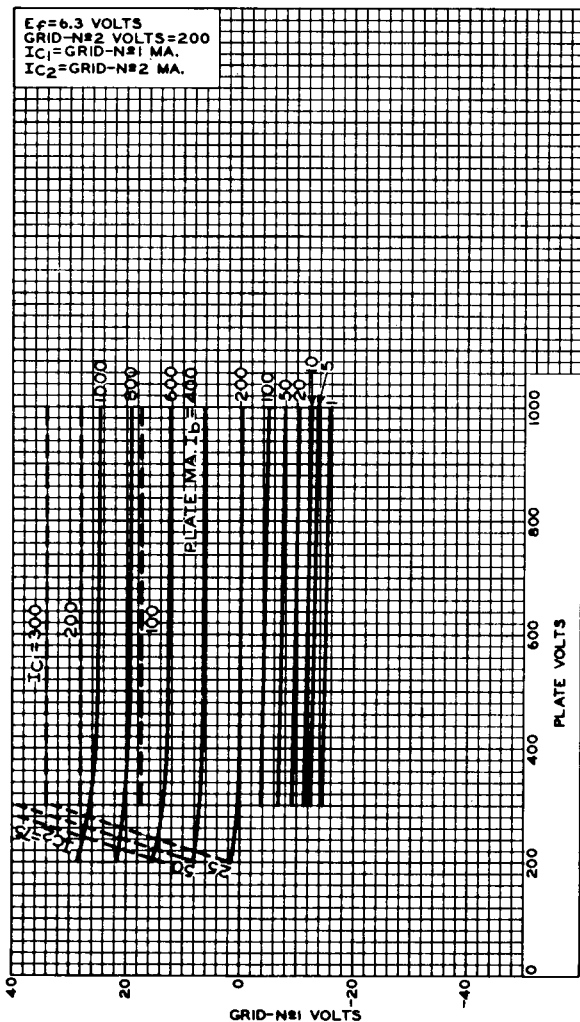
TYPICAL PLATE CHARACTERISTICS



TYPICAL PLATE CHARACTERISTICS



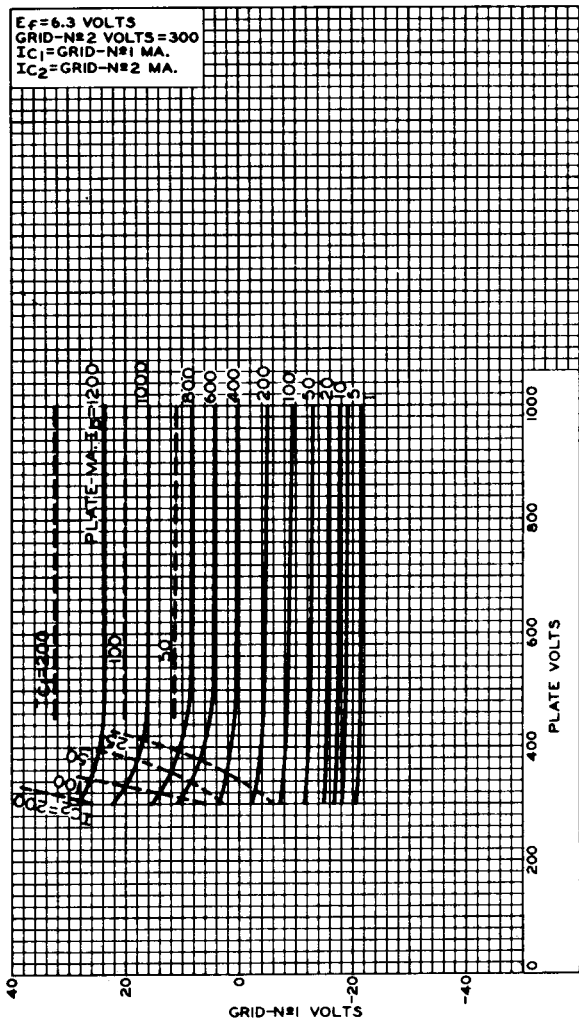
TYPICAL CONSTANT-CURRENT CHARACTERISTICS



92CM-9233RI



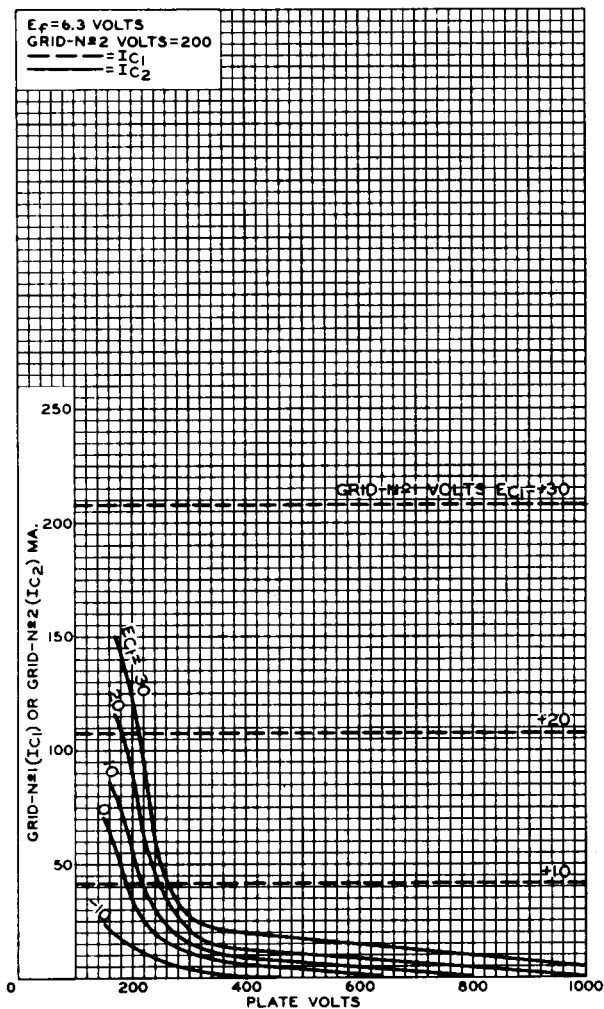
TYPICAL CONSTANT-CURRENT CHARACTERISTICS



92CM-9232RI



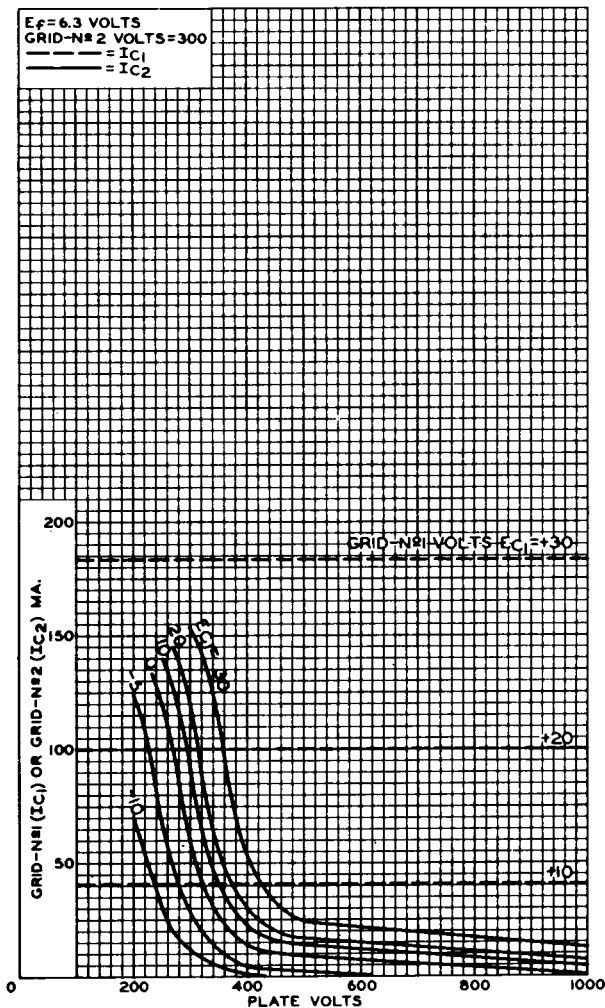
TYPICAL CHARACTERISTICS



92CM-9224R1



TYPICAL CHARACTERISTICS

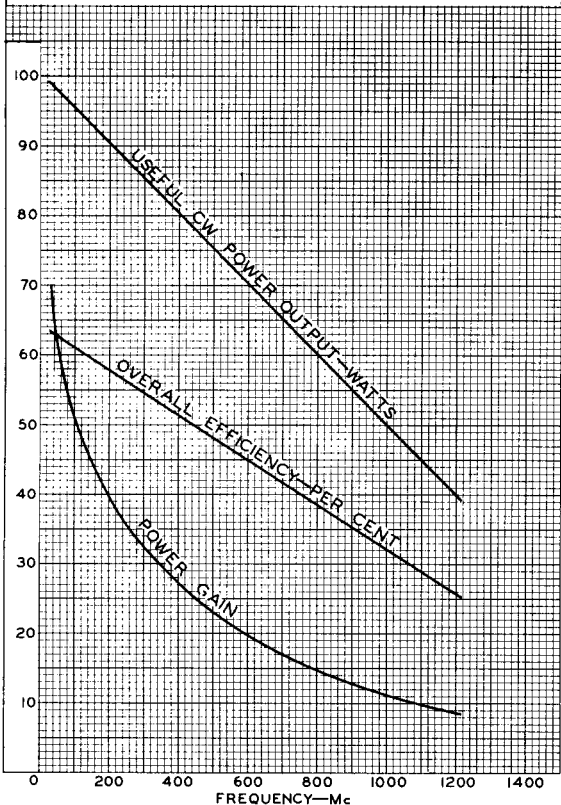


92CM-9225R2



TYPICAL PERFORMANCE CHARACTERISTICS In Class C Telegraphy or Class C FM Telephony Amplifier Service

E_f = ADJUSTED TO SIMULATE NORMAL OPERATING
 CONDITIONS OF HEATER IN UHF SERVICE
 PLATE VOLTS = 900
 GRID-N \times 2 VOLTS = 300
 PLATE AMPERES = 0.170
 OVERALL EFFICIENCY = USEFUL POWER OUTPUT IN LOAD
 DIVIDED BY DC PLATE INPUT
 POWER GAIN = USEFUL POWER OUTPUT IN LOAD
 DIVIDED BY DRIVER POWER OUTPUT



92CM-9221



Beam Power Tube

CERMOLOX TYPE

OXIDE-COATED CATHODE
80 WATTS CW POWER OUTPUT
AT 400 MHZ

FORCED-AIR COOLED
40 WATTS CW POWER OUTPUT
AT 1215 MHZ

For Use in Compact Aircraft, Mobile, and Stationary Equipment

ELECTRICAL

Heater, for Unipotential Cathode⁹

Voltage (AC or DC)	{ 6.3 typ V	{ 6.9 max V
Current at heater volts = 6.3	2.1	A
Minimum heating time	60	s

Mu-Factor, Grid No.2 to Grid No.1 18

Direct Interelectrode Capacitances^a

Grid No.1 to plate	0.065 max	pF
Grid No.1 to cathode & heater	13.0	pF
Plate to cathode & heater	0.013 max	pF
Grid No.1 to grid No.2	18.0	pF
Grid No.2 to plate	4.8	pF
Grid No.2 to cathode & heater	0.45 max	pF

MECHANICAL

Operating Position	Any
Overall Length	1.93 max in
Greatest Diameter	1.265 max in
Weight (Approx.)	2 oz
Radiator	Integral part of tube

For operation up to 400 MHZ

Socket including Grid-No.2

Bypass Capacitor Erie^b 2948-000, E.F. Johnson^c
DNI24-152-1 Jettron^d 89-001, or equivalent

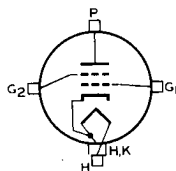
Grid-No.2 Bypass Capacitor Erie^b 2926-000, 2929-001,
or equivalent

For operation at high frequencies

See Preferred Mounting Arrangement

TERMINAL DIAGRAM (See Dimensional Outline)

- G₁ - Grid No.1-Terminal
Contact Surface
G₂ - Grid No.2-Terminal
Contact Surface
H - Heater-Terminal
Contact Surface
H, K - Heater-& Cathode-Terminal
Contact Surface
P - Plate Terminal Contact
Surface



← Indicates a change.



THERMAL

Terminal Temperature (Plate, Grid No.2, Grid No.1, cathode, and heater)	250 max	°C
Plate-Core Temperature.	250 max	°C

See Dimensional Outline for temperature-measurement points

Air Flow^h (See Typical Cooling Requirements)AF POWER AMPLIFIER & MODULATOR—Class AB₁^j

Maximum CCS Ratings, Absolute-Maximum Values

DC plate voltage.	1000	V
DC grid-No.2 (screen-grid) voltage.	300	V
Max.-signal dc plate current.	180	mA
Max.-signal plate input.	180	W
Max.-signal grid-No.2 input.	4.5	W
Plate dissipation.	115	W

Typical CCS Operation

Values are for 2 tubes

DC Plate Voltage.	650	850	V
DC Grid-No.2 Voltage.	300	300	V
DC Grid-No.1 (Control-Grid) Voltage.	-15	-15	V

From fixed-bias source

Peak AF Grid-No.1-to-Grid-No.1 Voltage.	30	30	V
Zero-Signal DC Plate Current.	80	80	mA
Max.-Signal DC Plate Current.	200	200	mA
Zero-Signal DC Grid-No.2 Current.	0	0	mA
Max.-Signal DC Grid-No.2 Current.	20	20	mA
Effective Load Resistance.	4330	7000	Ω

Plate to plate

Max.-Signal Driving Power (Approx.).	0	0	W
Max.-Signal Power Output (Approx.).	50	80	W

Maximum Circuit Values

Grid-No.1-Circuit Resistance Under Any Condition

With fixed-bias.	30000	Ω
With cathode-bias.	Not recommended	

AF POWER AMPLIFIER & MODULATOR — Class AB₂^j

Maximum CCS Ratings, Absolute-Maximum Values

DC plate voltage.	1000	V
DC grid-No.2 (screen-grid) voltage.	300	V
Max.-signal dc plate current.	180	mA
Max.-signal dc grid-No.1 (control grid) current.	30	mA
Max.-signal plate input.	180	W
Max.-signal grid-No.2 input.	4.5	W
Plate dissipation.	115	W

Typical CCS Operation

Values are for 2 tubes

DC Plate Voltage.	650	850	V
DC Grid-No.2 Voltage.	300	300	V
DC Grid-No.1 Voltage.	-15	-15	V

From fixed-bias source



Peak AF Grid-No.1-to-Grid-No.1 Voltage . . .	46	46	V
Zero-Signal DC Plate Current	80	80	mA
Max.-Signal DC Plate Current	355	355	mA
Zero-Signal DC Grid-No.2 Current	0	0	mA
Max.-Signal DC Grid-No.2 Current	25	25	mA
Max.-Signal DC Grid-No.1 Current	15	15	mA
Effective Load Resistance.	2450	3960	Ω
Plate to plate			
Max.-Signal Driving Power (Approx.).	0.3	0.3	W
Max.-Signal Power Output (Approx.)	85	140	W

LINEAR RF POWER AMPLIFIER, Class AB₁^j

Single-Sideband Suppressed-Carrier Service

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

Maximum CCS Ratings, Absolute-Maximum Values

	<i>Up to 1215 MHz</i>		
DC plate voltage	1000		V
DC grid-No.2 voltage	300		V
DC grid-No.1 voltage	100		V
DC plate current at peak of envelope	350 ^e		mA
DC grid-No.1 current	30		mA
Plate input.	180		W
Grid-No.2 Input.	4.5		W
Plate dissipation.	115		W

Typical CCS Operation with "Two-Tone" Modulation

	<i>At 30 MHz</i>		
DC Plate Voltage	650	850	V
DC Grid-No.2 Voltage	300	300	V
DC Grid-No.1 Voltage	-18.5	-18.5	V
Zero-Signal DC Plate Current	40	40	mA
Effective RF Load Resistance	2200	3500	Ω
DC Plate Current at Peak of Envelope	100	100	mA
Average DC Plate Current	75	75	mA
DC Grid-No.2 Current at Peak of Envelope.	8.2	4.2	mA
Average DC Grid-No.2 Current	3.6	1.7	mA
Peak-Envelope Driver Power Output (Approx.).	0.5	0.5	W
Output-Circuit Efficiency (Approx.).	90	90	%
Distortion Products Level			
Third Order.	35	30	dB
Fifth Order.	40	36	dB
Useful Power Output (Approx.)			
Average.	12.5	20	W
Peak envelope.	25	40	W

Maximum Circuit Values

Grid-No.1-Circuit Resistance

Under Any Condition

With fixed bias.	25000	Ω
With fixed bias (In Class AB ₁ operation).	100000	Ω
With cathode bias.	Not recommended	
Grid-No.2 Circuit Impedance.	See Footnote ^k	
Plate Circuit Impedance.	See Footnote ^m	



PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony^j

Carrier conditions per tube for use with a maximum modulation factor of 1

Maximum CCS Ratings, Absolute-Maximum Values

Up to 1215 MHz

DC plate voltage	800	V
DC grid-No.2 (screen-grid) voltage	300	V
DC grid-No.1 (control-grid) voltage	-100	V
DC plate current	150	mA
DC grid-No.1 current	30	mA
Plate input	120	W
Grid-No.2 input	3	W
Plate dissipation	75	W

Typical CCS Operation

At 400 MHz

DC Plate Voltage	400	700	V
DC Grid-No.2 Voltage	200	250	V
DC Grid-No.1 Voltage	-20	-50	V
DC Plate Current	100	130	mA
DC Grid-No.2 Current	5	10	mA
DC Grid-No.1 Current	5	10	mA
Driver Power Output (Approx.)	2	3	W
Useful Power Output (Approx.)	16	45	W

Maximum Circuit Values

Grid-No.1-Circuit Resistance

Under Any Condition	30000	Ω
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RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy and

RF POWER AMPLIFIER — Class C FM Telephony^j

Maximum CCS Ratings, Absolute-Maximum Values

Up to 1215 MHz

DC plate voltage	1000	V
DC grid-No.2 voltage	300	V
DC grid-No.1 voltage	-100	V
DC plate current	180	mA
DC grid-No.1 current	30 ^f	mA
Plate input	180	W
Grid-No.2 input	4.5	W
Plate dissipation	115	W

Typical CCS Operation

At 400 MHz At 1215 MHz

DC Plate Voltage	400	900	900	V
DC Grid-No.2 Voltage	200	300	300	V
DC Grid-No.1 Voltage	-35	-30	-22	V
DC Plate Current	150	170	170	mA
DC Grid-No.2 Current	5	1	1	mA
DC Grid-No.1 Current	3	10	4	mA
Driver Power Output (Approx.)	3	3	5	W
Useful Power Output (Approx.)	23	80	40	W



Maximum Circuit Value

Grid-No.1-Circuit Resistance

Under Any Condition 30000 Ω

- ^a Measured with special shield adapter.
- ^b Erie Technological Products, Inc., 2206 West 15th Street, Erie, Pennsylvania.
- ^c E. F. Johnson Co., 299 10th Ave., S.W., Waseca, Minn.
- ^d Jettron Products, Inc., 56 Rt. 10, Hanover, N.J.
- ^e The maximum rating for a signal having a minimum peak-to-average power ratio less than 2, such as is obtained in "Single-Tone" operation, is 180 mA. During short periods of circuit adjustment under "Single-Tone" conditions, the average plate current may be as high as 250 mA.
- ^f In applications where the frequency is less than 80 MHz and the bias is less than \sim 50 volts, the maximum value is 40 mA.

The following footnotes apply to the RCA Transmitting Tube Operating Considerations given at front of this section.

- ^g See *Electrical Considerations* — Filament or Heater.
- ^h See *Cooling Considerations* — Forced-Air Cooling.
- ^j See *Classes of Service*.
- ^k See *Electrical Considerations* — Grid-No.2 Voltage Supply.
- ^m See *Electrical Considerations* — Plate Voltage Supply.

CHARACTERISTICS RANGE VALUES

	Note	Min	Max	
1. Heater Current	1	1.84	2.26	A
2. Direct Interelectrode Capacitances				
Grid No.1 to plate	2	-	0.065	pF
Grid No.1 to cathode & heater	2	11.0	15.0	pF
Plate to cathode & heater	2	-	0.013	pF
Grid No.1 to grid No.2	2	15.0	20.0	pF
Grid No.2 to plate	2	4.2	5.2	pF
Grid No.2 to cathode & heater	2	0.20	0.45	pF
3. Grid-No.1 Voltage	1,3	-6	-15	V
4. Grid-No.1 Cutoff Voltage	1,4	-	-48	V
5. Grid-No.1 Current	1,5	6	-	mA
6. Reverse Grid-No.1 Current	1,3	-	8	μ A
7. Grid-No.2 Current	1,3	-8	+2.0	mA
8. Peak Emission	1,6	-	300	peak
9. Interelectrode Leakage				
Resistance	7	1.0	-	M Ω
10. Useful Power Output	8	80	-	W

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

Note 2: Measured with special shield adapter.

Note 3: With dc plate voltage of 1000 volts, dc grid-No.2 voltage of 300 volts, and dc grid-No.1 voltage adjusted to give a dc plate current of 115 mA.

Note 4: With dc plate voltage of 1000 volts, dc grid-No.2 voltage of 300 volts, and dc grid-No.1 voltage adjusted to give a dc plate current of 1 mA.

Note 5: With plate and grid-No.2 floating and dc grid-No.1 voltage of +2 volts.

Note 6: With grid No.1, grid No.2, and plate tied together; and pulse voltage source connected between plate and cathode. Pulse



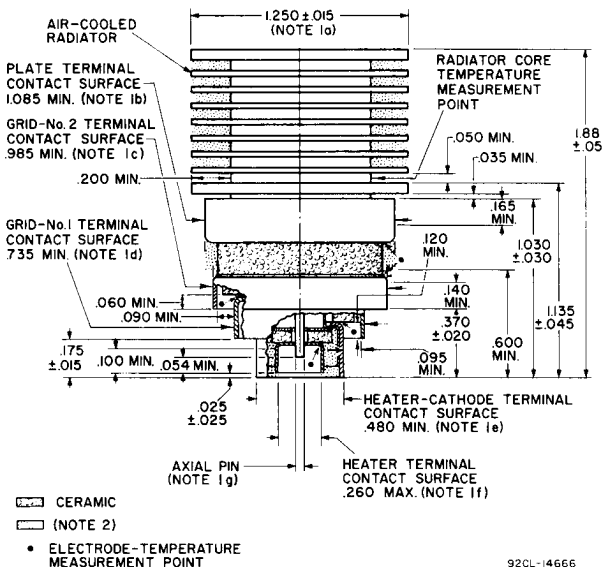
duration is 2 microseconds, pulse repetition frequency is 60 pps, and duty factor is 0.00012. The voltage-pulse amplitude is adjusted until a peak cathode current of 10 amperes is obtained. After 1 minute at this value, the voltage-pulse amplitude will not exceed 300 volts (peak).

Note 7: With tube at 20° to 30° C for at least 30 minutes without any voltages applied to the tube. The minimum resistance between any two adjacent electrodes as measured with a 200-volt Megger-type ohmmeter having an internal impedance of 1.0 megohm, will be 1.0 megohm.

Note 8: In a single-tube, grid-drive coaxial-cavity class C amplifier circuit at 400 MHz and for conditions with 5.7 volts ac or dc on heater, dc plate voltage of 1000 volts, dc grid-No.2 voltage of 300 volts, grid-No.1 resistor adjustable between zero and 10000 ohms, dc plate current of 180 mA maximum, dc grid-No.1 current of 30 mA maximum and driver power output of 3 watts.



DIMENSIONAL OUTLINE



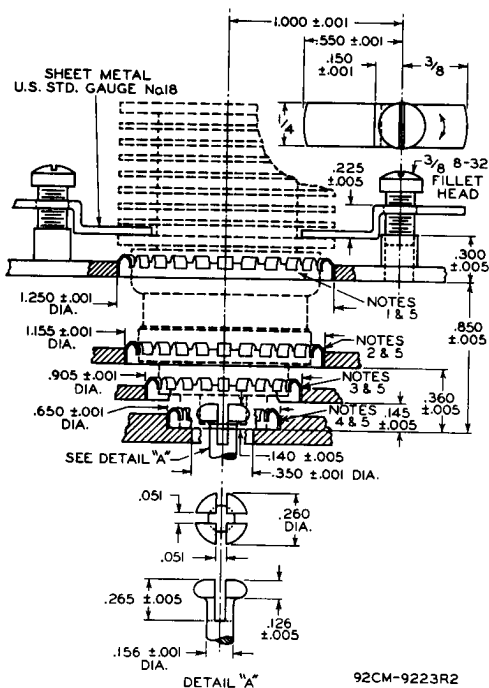
Note 1: The following diametrical space requirements accommodate the concentricity of the cylindrical surfaces of the radiator fins, axial pin, and each electrode terminal:

- a. Radiator Band - 1.316"
- b. Plate Terminal - 1.119"
- c. Grid-No. 2 Terminal - 1.019"
- d. Grid-No. 1 Terminal - 0.764"
- e. Heater-Cathode Terminal - 0.519"
- f. Heater Terminal - 0.240"
- g. Axial Pin - 0.071"

Note 2: Keep all stippled regions clear. Do not allow contacts or circuit components to protrude into these annular volumes.

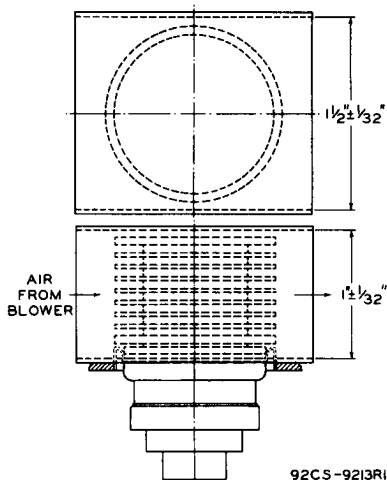


PREFERRED MOUNTING ARRANGEMENT

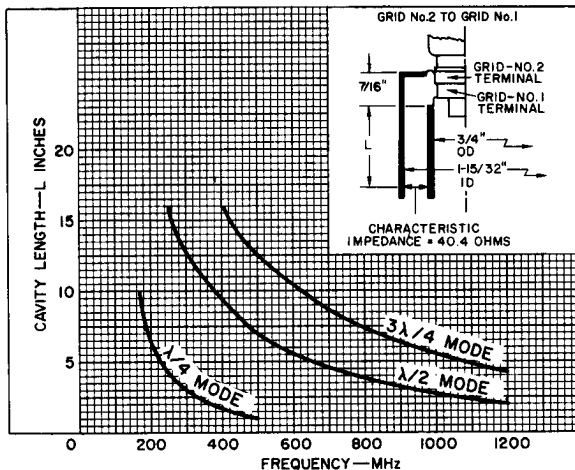


- Note 1:** Contact ring No.97-252 or finger stock No.97-380.
Note 2: Contact ring No.97-253 or finger stock No.97-380.
Note 3: Contact ring No.97-254 or finger stock No.97-380.
Note 4: Contact ring No.97-255 or finger stock No.97-380.
Note 5: The specified contact ring of preformed finger stock and finger stock No.97-380 provide adequate electrical contact, but the finger stock No.97-380 is less susceptible to breakage than the specified contact ring. Both types are made by Instruments Specialties Co., Little Falls, N.J.

RECOMMENDED COWLING
FOR DIRECTING AIR FLOW THROUGH RADIATOR



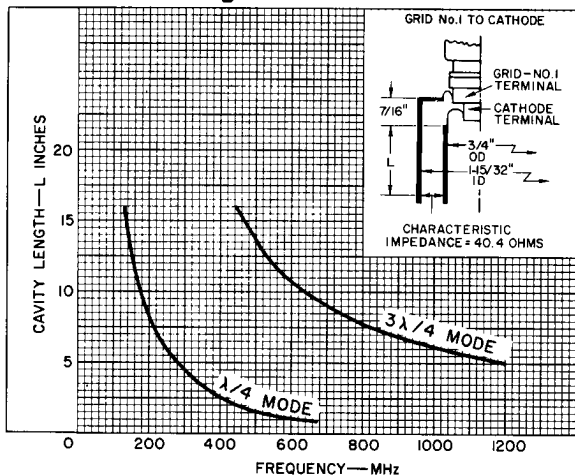
Tuning Characteristics



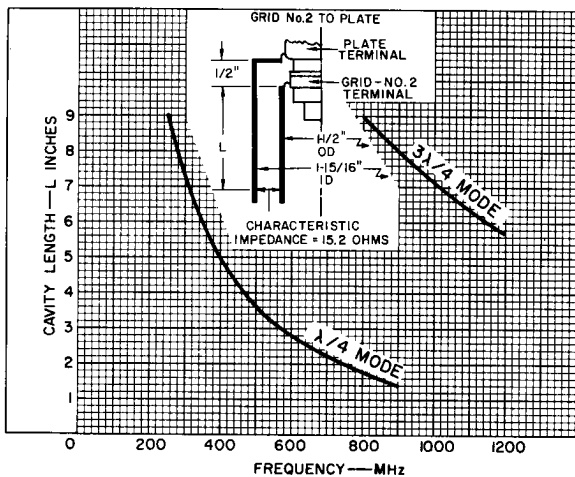
92CS-14614



Tuning Characteristics

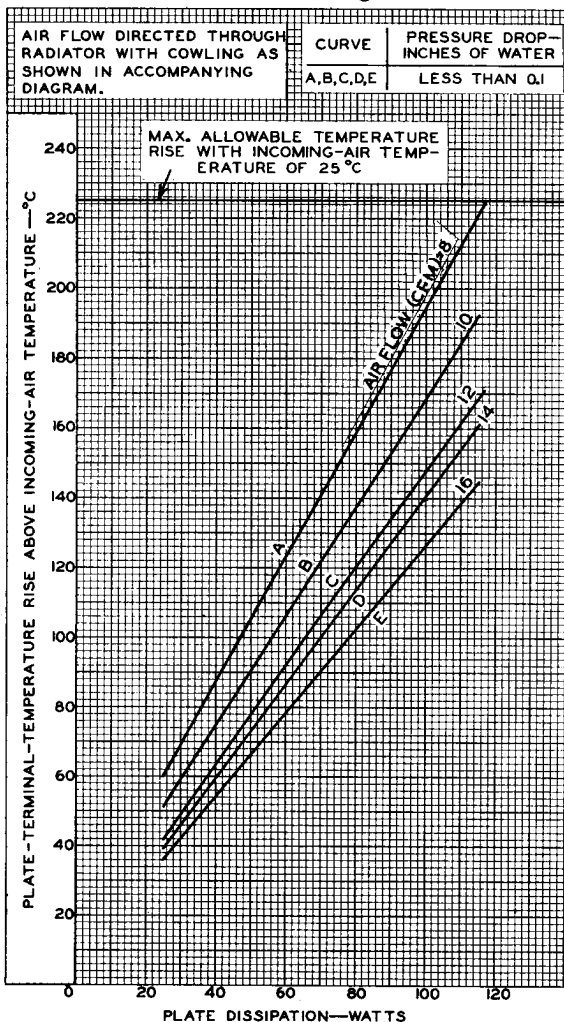


92CS-14613



92CS-14615

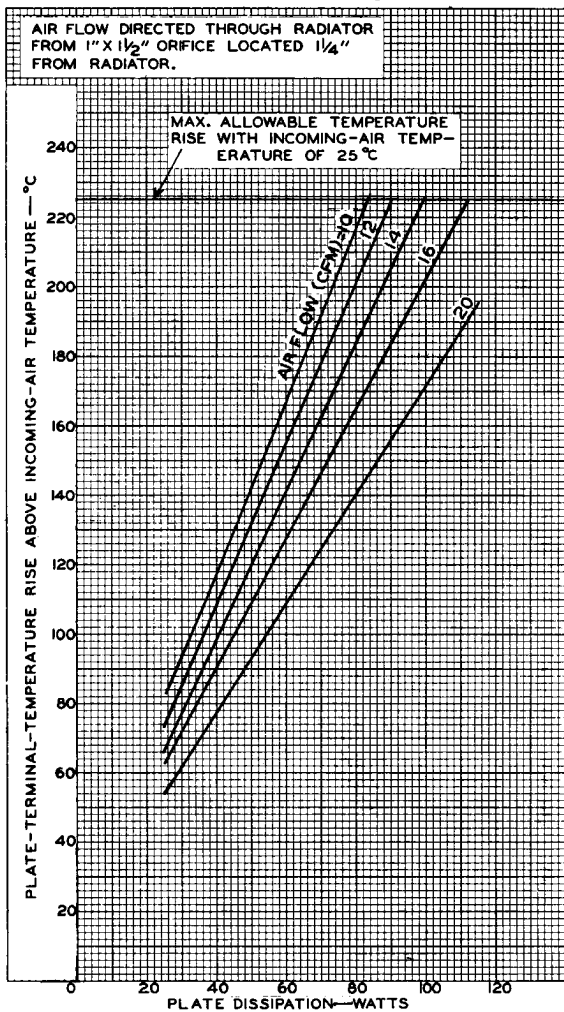
TYPICAL COOLING REQUIREMENTS With Cowling



92CM-9219RI



TYPICAL COOLING REQUIREMENTS Without Cowling

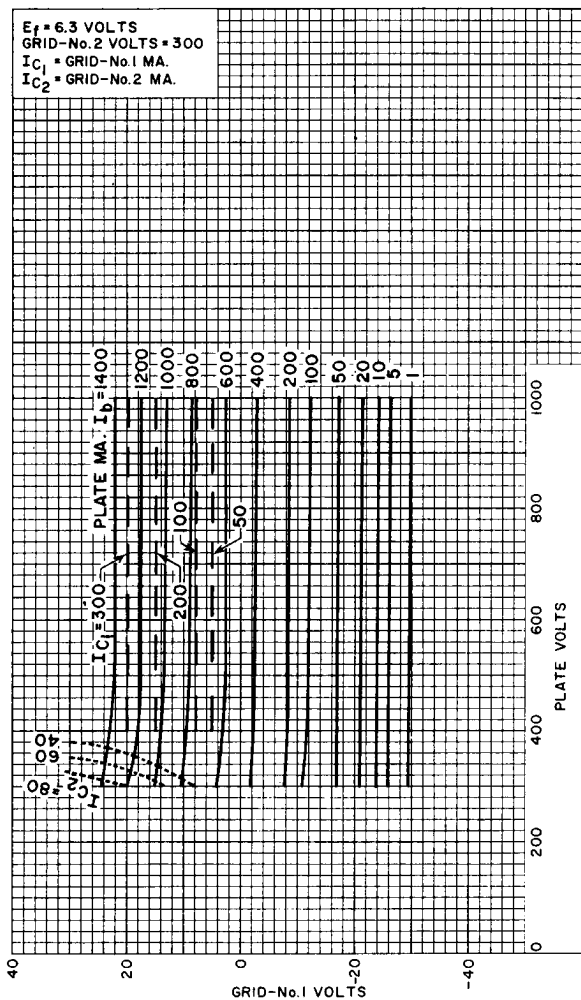


92CM-9220R1



Typical Constant-Current Characteristics

With Grid-No. Volts = 300



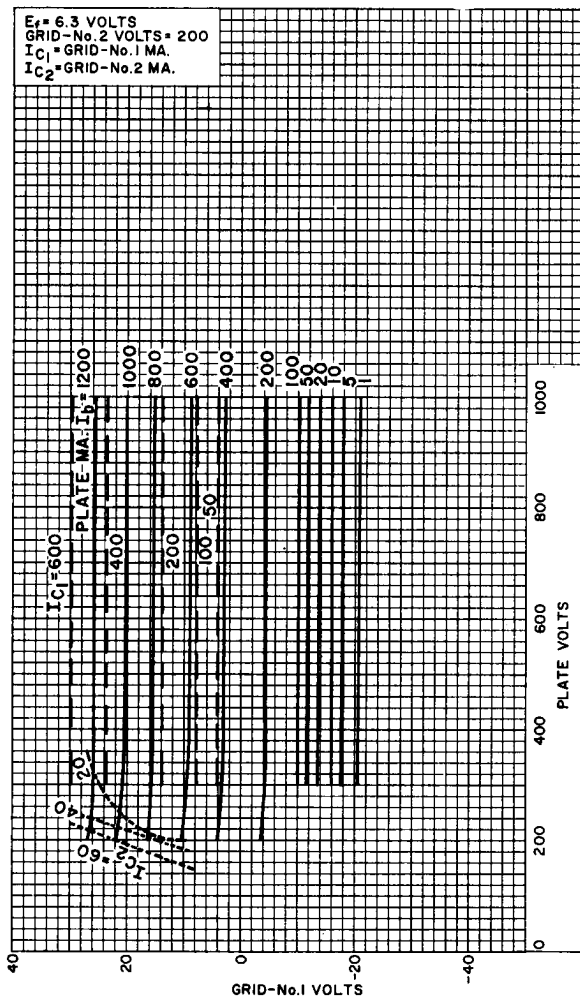
92CM-11749



Typical Constant-Current Characteristics

With Grid-No.2 Volts = 200

$E_c = 6.3$ VOLTS
 GRID-No.2 VOLTS = 200
 $I_{C1} =$ GRID-No.1 MA.
 $I_{C2} =$ GRID-No.2 MA.



92CM-11745

