



9C21

9C21

POWER TRIODE**WATER- & FORCED-AIR-COOLED**GENERAL DATA**Electrical:**

Filament, Multistrand Tungsten:

Excitation . . . Single Phase AC or DC

Voltage 19.5 ac or dc volts

Current 415 amp

Starting Current: The filament current must never exceed 750 amperes, even momentarily.

Cold Resistance . . . 0.0042 ohm

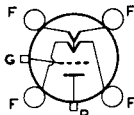
Amplification Factor . . 36

Direct Interelectrode Capacitances (Approx.):

Grid to Plate 46 μf Grid to Filament . . . 100 μf Plate to Filament . . . 2.0 μf **Mechanical:**

Terminal Connections:

F - Filament

G - Grid-Flange
TerminalP - Water-Cooled
Plate
TerminalDIAMETRICALLY OPPOSITE TERMINALS
MUST BE CONNECTED TOGETHER

Mounting Position Vertical, Filament End Up

Maximum Overall Length 24-1/2"

Maximum Diameter 9-1/2"

Water Jacket RCA MI - 19460

Gasket RCA MI - 27001

Water Flow 15 to 20 gpm

The water flow must start before the application of any voltages and must continue for at least 2 minutes after the removal of all voltages.

Air Flow:

To Filament Seals 10 min. cfm

The specified air flow directed by a nozzle of 1-1/4" diameter into the filament header is required before and during the application of any voltages to limit the temperature of the filament seals to the maximum value.

To Plate Seal and Bulb 250 cfm

The specified air flow at a pressure of 1.3 inches of water must be directed at and distributed uniformly around the plate seal and bulb to limit the temperature of each to its maximum value at the hottest point.

Outlet Water Temperature 70 max. °C

Bulb Temperature 180 max. °C

Seal Temperature (Filament, grid, plate) . . . 165 max. °C

AF POWER AMPLIFIER & MODULATOR - Class B**Maximum CCS* Ratings, Absolute Values:**

DC PLATE VOLTAGE 15000 max. volts

MAX.-SIGNAL DC PLATE CURRENT* 6 max. amp

MAX.-SIGNAL PLATE INPUT* 90 max. kw

PLATE DISSIPATION* 40 max. kw

* See next page.

← Indicates a change.

9C21



9C21

POWER TRIODE

Typical Operation:*Unless otherwise specified, values are for 2 tubes*

DC Plate Voltage	10200	14000	volts
DC Grid Voltage	-220	-300	volts
Peak AF Grid-to-Grid Voltage	850	1050	volts
Zero-Signal DC Plate Current	0.6	0.6	amp
Max.-Signal DC Plate Current	5.7	7.1	amp
Effective Load Resistance (plate-to-plate)	3600	4000	ohms
Max.-Signal Driving Power (Approx.)#	110	150	watts
Max.-Signal Power Output (Approx.) .	36	61	kw

PLATE-MODULATED RF POWER AMPLIFIER - Class C Telephony*Carrier conditions per tube for use with a max. modulation factor of 1.0***Maximum CCS* Ratings, Absolute Values:**

DC PLATE VOLTAGE	12500 max.	volts
DC GRID VOLTAGE	-2000 max.	volts
DC PLATE CURRENT	4 max.	amp
→ DC GRID CURRENT	1.5 max.	amp
PLATE INPUT	50 max.	kw
PLATE DISSIPATION	28 max.	kw

Typical Operation:

DC Plate Voltage	10200	12500	volts
DC Grid Voltage [⊙]	{ -1500 2000	-1670	volts
		2100	ohms
Peak RF Grid Voltage	1960	2190	volts
DC Plate Current	3.1	3.5	amp
DC Grid Current (Approx.) [⊠]	0.75	0.79	amp
Driving Power (Approx.) [⊠]	1320	1570	watts
Power Output (Approx.)	27.5	38	kw

RF POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy*Key-down conditions per tube without modulation[⊠]***Maximum CCS* Ratings, Absolute Values:**

DC PLATE VOLTAGE	17000 max.	volts
DC GRID VOLTAGE	-2000 max.	volts
DC PLATE CURRENT	9 max.	amp
→ DC GRID CURRENT	1.5 max.	amp
PLATE INPUT	150 max.	kw
PLATE DISSIPATION	40 max.	kw

Typical Operation:

DC Plate Voltage	14000	17000	volts
DC Grid Voltage ^{▲▲}	{ -1500 230 1800	-1600	volts
		180	ohms
		1780	ohms

•, *, #, ⊙, ⊠, ▲▲: See next page.

→ Indicates a change.



9C21

POWER TRIODE

9C21

Peak RF Grid Voltage	2000	2200	volts
DC Plate Current	5.8	7.9	amp
DC Grid Current (Approx.)	0.83	0.9	amp
Driving Power (Approx.)	1500	1800	watts
Power Output (Approx.)	61	100	kw

- Continuous Commercial Service.
- * Averaged over any audio-frequency cycle of sine-wave form.
- # The driving stage should have good regulation and should be capable of supplying considerably more than the specified driving power.
- ⊗ Obtained by grid resistor (2000, 2100) or by partial self-bias methods.
- Subject to wide variations as explained under TUBE RATINGS in General Section.
- Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.
- ▲▲ Obtained from cathode resistor (230, 180), or grid resistor (1800, 1780) or by partial self-bias methods.

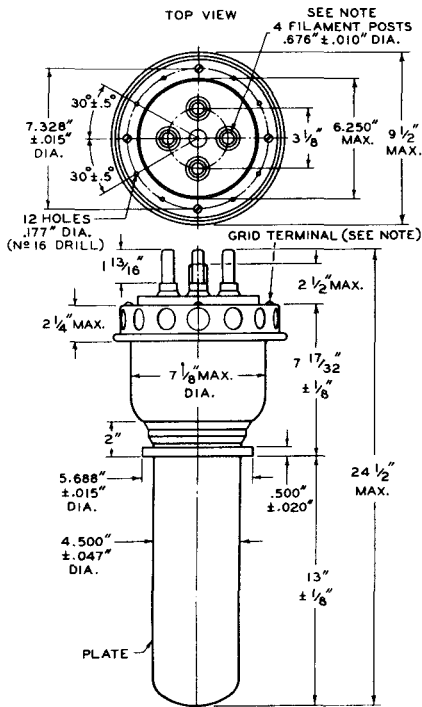
Data on operating frequencies for the 9C21 are given
on the sheet TRANS. TUBE RATINGS vs FREQUENCY.

9C21



9C21

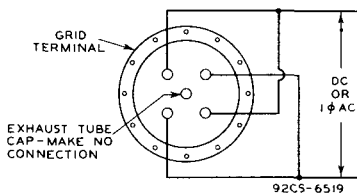
POWER TRIODE



NOTE: FLEXIBLE CONNECTIONS ARE REQUIRED.

92CM-6438R1

FILAMENT CONNECTIONS



92CS-6519

OCTOBER 15, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

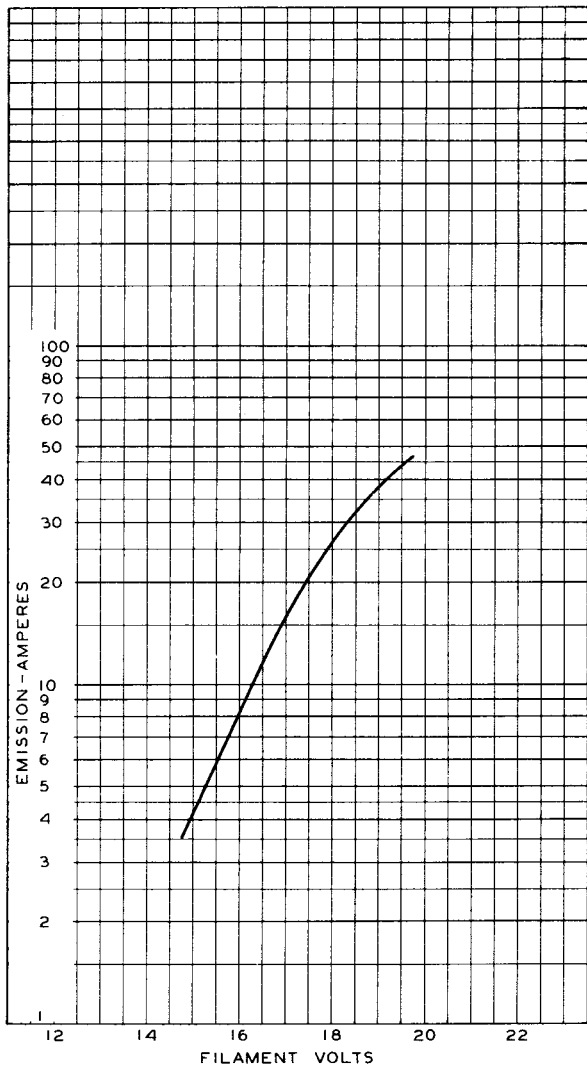
CE-6438R1-6519



9C21

9C21

AVERAGE FILAMENT-EMISSION CHARACTERISTIC



DEC. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

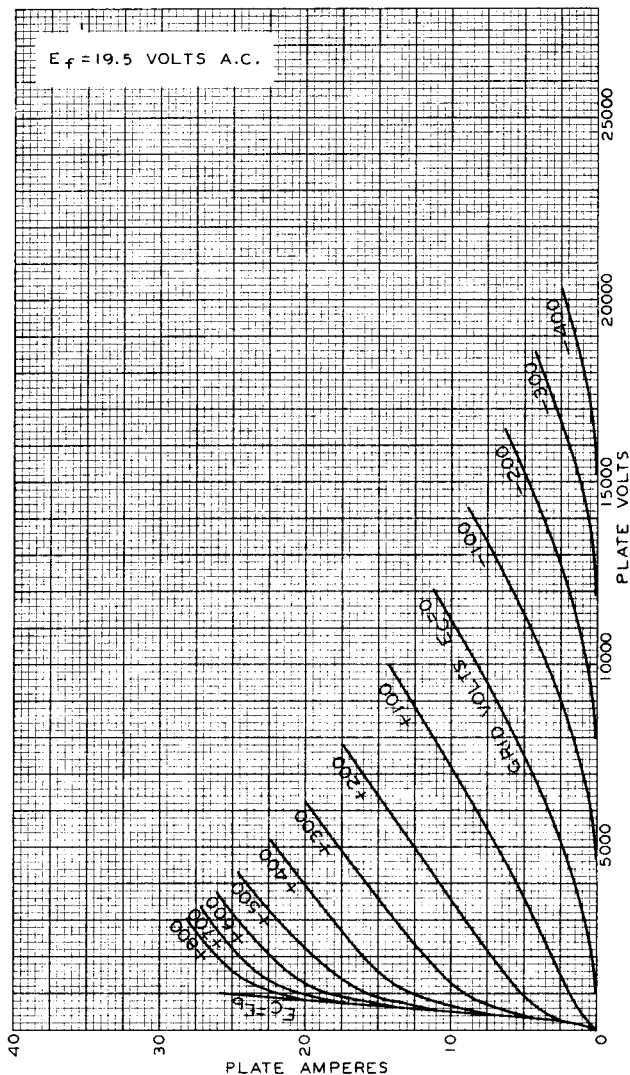
92CM-6458

9C21



9C21

AVERAGE PLATE CHARACTERISTICS



DEC. 1, 1943

 RCA VICTOR DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

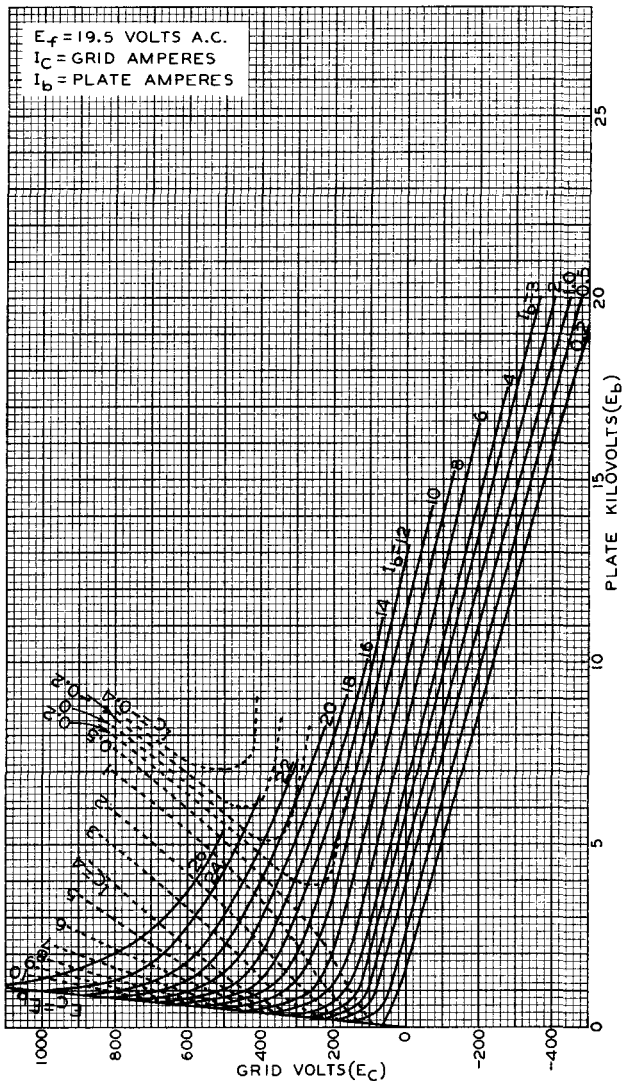
92CM-6461



9C21

9C21

AVERAGE CONSTANT-CURRENT CHARACTERISTICS



DEC. 1, 1943

RCA VICTOR DIVISION

92CM-6462

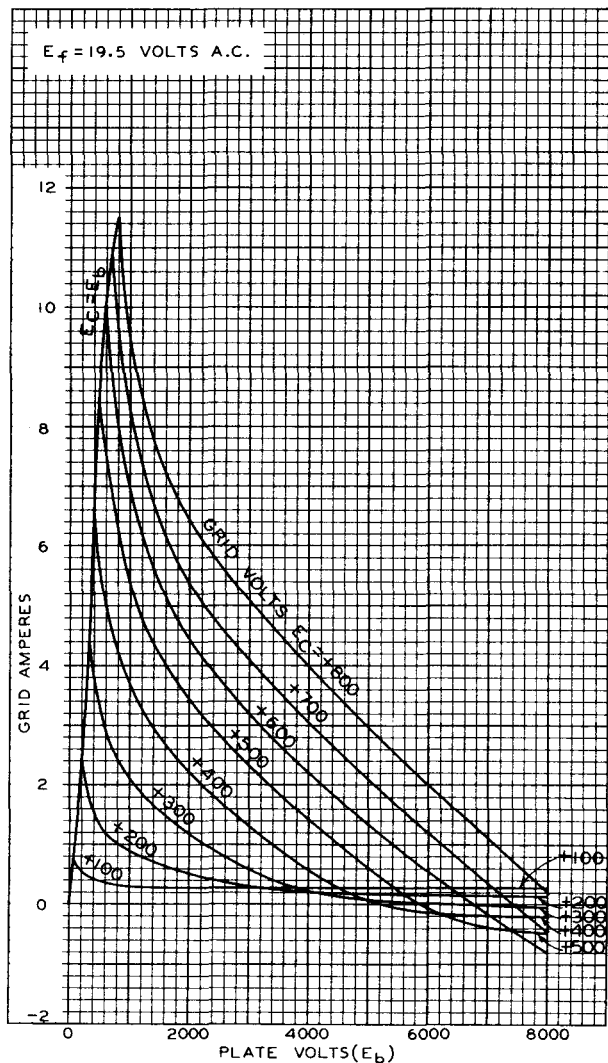
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

9C21



9C21

TYPICAL CHARACTERISTICS



DEC. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

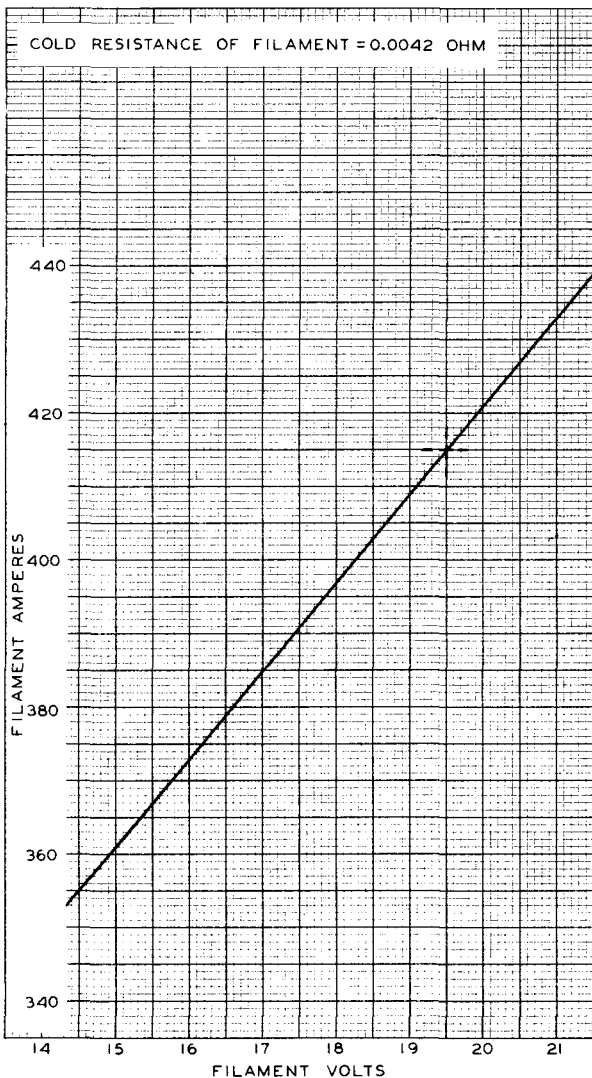
92CM-6463



9C21

9C21

AVERAGE FILAMENT CHARACTERISTIC



DEC. 1, 1943

TUBE DEPARTMENT

92CM-6457

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

Power Triode

WATER- AND FORCED-AIR COOLED

GENERAL DATA

Electrical:

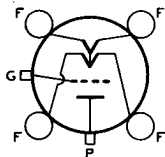
Filament, Multistrand Tungsten:

Excitation.	DC or Single Phase AC	
Voltage (AC or DC).	19.5 volts	
Current	415 amp	
Starting Current: The filament current should never exceed 750 amperes, even momentarily.		
Cold Resistance	0.0042 ohm	
Amplification Factor.	40	
Direct Interelectrode Capacitances (Approx.):		
Grid to plate	53 pf	
Grid to filament.	103 pf	
Plate to filament	1.2 pf	

Mechanical:

Operating Position.	Vertical, filament end up
Maximum Overall Length.	24-1/2"
Maximum Diameter.	9-1/2"
Weight (Approx.).	26 lbs
Terminal Diagram (See <i>Dimensional Outline</i>):	

F—Filament
G—Grid



P—Plate

DIAMETRICALLY OPPOSITE TERMINALS
MUST BE CONNECTED TOGETHER

Thermal:

Water Flow. 15 to 20 gpm

The water flow must start before the application of any voltages and must continue for at least 2 minutes after the removal of all voltages.

Air Flow:

To filament seals 10 min. cfm

The specified air flow directed by a nozzle of 1-1/4" diameter into the filament header is required before and during the application of any voltages to limit the temperature of the filament seals to the maximum value.

To plate seal and bulb. 250 min. cfm →

The specified air flow at a pressure of 1.3 inches of water must be directed at and distributed uniformly around the plate seal and bulb to limit the temperature of each to its maximum value at the hottest point.

← Indicates a change.



Outlet Water Temperature.	70 max.	°C
Bulb Temperature.	180 max.	°C
Seal Temperature (Filament, grid, plate).	165 max.	°C

AF POWER AMPLIFIER & MODULATOR — Class B

Maximum CCS^a Ratings, Absolute-Maximum Values:

DC PLATE VOLTAGE.	15000 max.	volts
MAX.—SIGNAL DC PLATE CURRENT ^b	6 max.	amp
MAX.—SIGNAL PLATE INPUT ^b	90 max.	kw
PLATE DISSIPATION ^b	40 max.	kw

Typical Operation:

Unless otherwise specified, values are for 2 tubes

DC Plate Voltage.	10200	14000	volts
DC Grid Voltage.	-220	-300	volts
Peak AF Grid-to-Grid Voltage.	850	1050	volts
Zero-Signal DC Plate Current.	0.6	0.6	amp
Max.—Signal DC Plate Current.	5.7	7.1	amp
Effective Load Resistance (Plate to plate).	3600	4000	ohms
Max.—Signal Driving Power (Approx.) ^c	110	150	watts
Max.—Signal Power Output (Approx.)	36	61	kw

PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony

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

Maximum CCS^a Ratings, Absolute-Maximum Values:

DC PLATE VOLTAGE.	12500 max.	volts
DC GRID VOLTAGE.	-2000 max.	volts
DC PLATE CURRENT.	4 max.	amp
DC GRID CURRENT.	1.5 max.	amp
PLATE INPUT.	50 max.	kw
PLATE DISSIPATION.	28 max.	kw

Typical Operation:

DC Plate Voltage.	10200	12500	volts
DC Grid Voltage: ^d From a grid resistor of:			
2000 ohms.	-1500	—	volts
2100 ohms.	—	-1670	volts
Peak RF Grid Voltage.	1960	2190	volts
DC Plate Current.	3.1	3.5	amp
DC Grid Current (Approx.) ^e	0.75	0.79	amp
Driving Power (Approx.) ^e	1320	1570	watts
Power Output (Approx.)	27.5	38	kw

RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy^f

Maximum CCS^a Ratings, Absolute-Maximum Values:

DC PLATE VOLTAGE.	17000 max.	volts
DC GRID VOLTAGE.	-2000 max.	volts
DC PLATE CURRENT.	9 max.	amp

DC GRID CURRENT	1.5 max.	amp
PLATE INPUT	150 max.	kw
PLATE DISSIPATION	40 max.	kw

Typical Operation:

DC Plate Voltage.	14000	17000	volts
DC Grid Voltage: ^a			

From a grid resistor of:

1800 ohms	-1500	-	volts
1780 ohms	-	-1600	volts

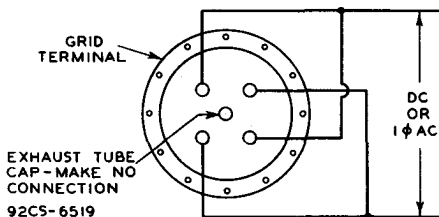
From a cathode resistor of:

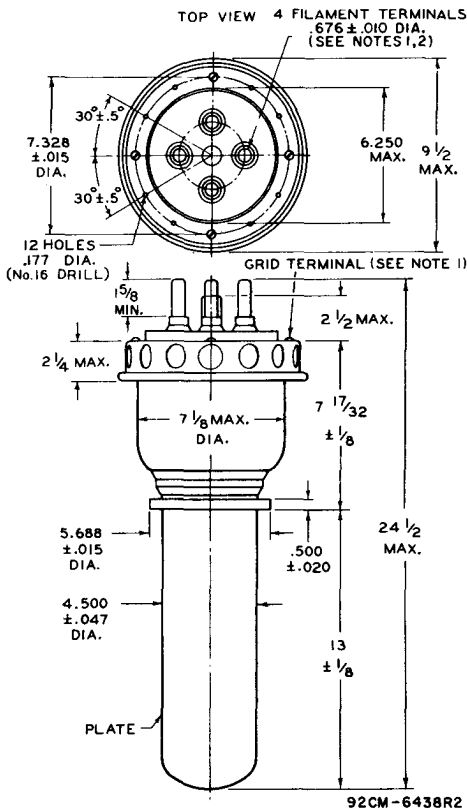
230 ohms.	-1500	-	volts
180 ohms.	-	-1600	volts

Peak RF Grid Voltage.	2000	2200	volts
DC Plate Current.	5.8	7.9	amp
DC Grid Current (Approx.)	0.83	0.9	amp
Driving Power (Approx.)	1500	1800	watts
Power Output (Approx.)	61	100	kw

^a Continuous Commercial Service.^b Averaged over any audio-frequency cycle of sine-wave form.^c The driving stage should have good regulation and should be capable of supplying considerably more than the specified driving power.^d obtained from a fixed supply, grid resistor, or a combination of both.^e Subject to wide variations as explained under TUBE RATINGS in General Section.^f Key-down conditions per tube without modulation. Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.^g obtained from a fixed supply, a cathode resistor, a grid resistor, or from a combination of a fixed supply and self-bias.**MAXIMUM RATINGS vs OPERATING FREQUENCY**

OPERATING FREQUENCY Mc	MAXIMUM PERMISSIBLE PERCENTAGE OF MAXIMUM-RATED PLATE VOLTAGE & PLATE INPUT	
	TELEPHONY	TELEGRAPHY
	Class C Plate-Modulated	Class C Unmodulated
15	100	100
20	88	82
25	81	70

FILAMENT CONNECTIONS



ALL DIMENSIONS IN INCHES

NOTE 1: FLEXIBLE CONNECTIONS ARE REQUIRED.

NOTE 2: FILAMENT-TERMINAL POSITIONS ARE HELD TO TOLERANCES SUCH THAT ENTIRE LENGTH OF TERMINALS WILL, WITHOUT UNDUE FORCE, PASS INTO AND DISENGAGE FROM FLAT-PLATE GAUGE HAVING A THICKNESS OF $\frac{1}{8}$ " AND FOUR HOLES WITH DIAMETERS OF $0.801" \pm 0.001"$ ARRANGED AT ANGLES OF $90^\circ \pm 10'$ ON A CIRCLE HAVING DIAMETER OF $3.125" \pm 0.001"$. GAUGE IS ALSO PROVIDED WITH A HOLE HAVING DIAMETER OF $1.250" \pm 0.010"$ CONCENTRIC WITH THE FILAMENT-TERMINAL CIRCLE.