



5831

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SUPER-POWER BEAM TRIODE

WATER COOLED

GENERAL DATA**Electrical:**

Filament, Multistrand Thoriated Tungsten:

Voltage (Single-Phase) 6 ac volts

Current 2220 amp

Starting Current Must never exceed 3550 amperes,
even momentarily

Cold Resistance 0.0005 ohm

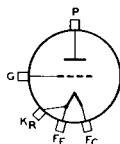
Minimum Heating Time 60 seconds

Amplification Factor 25

Direct Interelectrode Capacitances:

Grid to Plate 150 μf Grid to Filament 600 μf Plate to Filament 8 μf **Mechanical:**

Terminal Connections:

F_C—Filament
Cylindrical
TerminalF_F—Filament
Flange
TerminalK_R—Cathode Flange
Terminal For
Circuit ReturnsG—Grid Flange
TerminalP—Plate Flange
Terminal

Mounting Position Vertical, plate end up

Maximum Overall Length 38-3/4"

Maximum Diameter 9-17/32"

Water Cooling:

Water cooling of the beam-forming cylinder, the grid-terminal flange, and the plate is required. The water flow must start before application of any voltages and preferably should continue for several seconds after removal of all voltages. Interlocking of the water flow for each of the cooled elements with all power supplies is recommended to prevent tube damage in case of failure of adequate water flow. The use of distilled or deionized water is essential.

Water Flow:	Min. Flow	Pressure Drop $\#$	Max. Gauge Pressure*
	<i>gpm</i>	<i>psi</i>	<i>psi</i>
To Plate:			
For plate dissipation less than 135 kw. . .	40	10	100
For plate dissipation from 135 to 150 kw. .	60	20	100
To Grid Connector	1	—	—
To Beam-Forming Cylinder . .	6	20	50
Outlet Water Temperature (Any outlet)		70 max.	$^{\circ}\text{C}$

$\#$ Approximate pressure drop directly across cooled element for the indicated minimum flow.

* At tube inlets.



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Seal Temperature (Plate, grid, or filament)	165 max.	°C
Bulb Temperature (At hottest point)	180 max.	°C

Fittings:

Fittings for the plate and beam-forming-cylinder water connections may be obtained from B-R Engineering Company, 309 East Saratoga Street, Baltimore 2, Maryland, U.S.A.

AF POWER AMPLIFIER and MODULATOR—Class B

Maximum CCS* Ratings, Absolute Values:

DC PLATE VOLTAGE	10500 max.	volts
MAX.—SIGNAL DC PLATE CURRENT**	30 max.	amp
MAX.—SIGNAL PLATE INPUT**	300 max.	kw
PLATE DISSIPATION**	135 max.	kw

Typical Operation:

Values are for 2 tubes

DC Plate Voltage	10000	volts
DC Grid Voltage	-390	volts
Peak AF Grid-to-Grid Voltage	1800	volts
Zero-Signal DC Plate Current	6	amp
Max.—Signal DC Plate Current	57	amp
Effective Load Resistance (Plate-to-plate)	425	ohms
Max.—Signal Driving Power (Approx.) [▲]	800	watts
Max.—Signal Power Output (Approx.)	370	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	10500 max.	volts
DC GRID VOLTAGE	-2000 max.	volts
DC PLATE CURRENT	25 max.	amp
DC GRID CURRENT	1.5 max.	amp
PLATE INPUT	250 max.	kw
PLATE DISSIPATION	135 max.	kw

Typical Operation:

DC Plate Voltage	10000	volts
DC Grid Voltage [#]	-1350	volts
Peak RF Grid Voltage	2000	volts
DC Plate Current	21.9	amp

** 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 indicated value which is the power absorbed by the grid and grid-bias source and does not include circuit losses.

Obtained by grid resistor or by partial self-bias methods.



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DC Grid Current (Approx.) [□]	0.5	amp
Driving Power (Approx.) [□]	900	watts
Power Output (Approx.)	175	kw

RF POWER AMPLIFIER and OSCILLATOR—Class C Telegraphy*Key-down conditions per tube without amplitude modulation^{□□}***Maximum CCS* Ratings, Absolute Values:**

DC PLATE VOLTAGE	16000 max.	volts
DC GRID VOLTAGE	-2000 max.	volts
DC PLATE CURRENT	41 max.	amp
DC GRID CURRENT	1.5 max.	amp
PLATE INPUT	650 max.	kw
PLATE DISSIPATION	150 max.	kw

Typical Operation:

DC Plate Voltage	11500	16000	volts
DC Grid Voltage [•]	-1000	-1200	volts
Peak RF Grid Voltage	1650	2000	volts
DC Plate Current	33	39	amp
DC Grid Current (Approx.) [□]	0.65	0.5	amp
Driving Power (Approx.) [□]	1200	900	watts
Power Output (Approx.)	300	500	kw

^{□□} 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 fixed supply for amplifier service, or from adjustable grid resistor for oscillator service.

[□] For effect of load resistance on grid current and driving power, refer to TUBE RATINGS—Grid Current and Driving Power in the General Section.

[•] continuous commercial service.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	<u>Note</u>	<u>Min.</u>	<u>Max.</u>	
Filament Current	1	2090	2350	amp
Amplification Factor	1,2	20	30	
Grid-Plate Capacitance	—	125	175	μf
Grid-Filament Capacitance	—	500	700	μf
Plate-Filament Capacitance	—	4	12	μf

Note 1: With 6.0 volts ac on filament.

Note 2: With dc grid voltage of +25 volts, and with plate voltage adjusted to give dc plate current of 10 amperes.

The 5831 may be operated with maximum rated plate voltage and plate input at frequencies up through the "Standard Broadcast Band" and much higher. The limitations for operation at the

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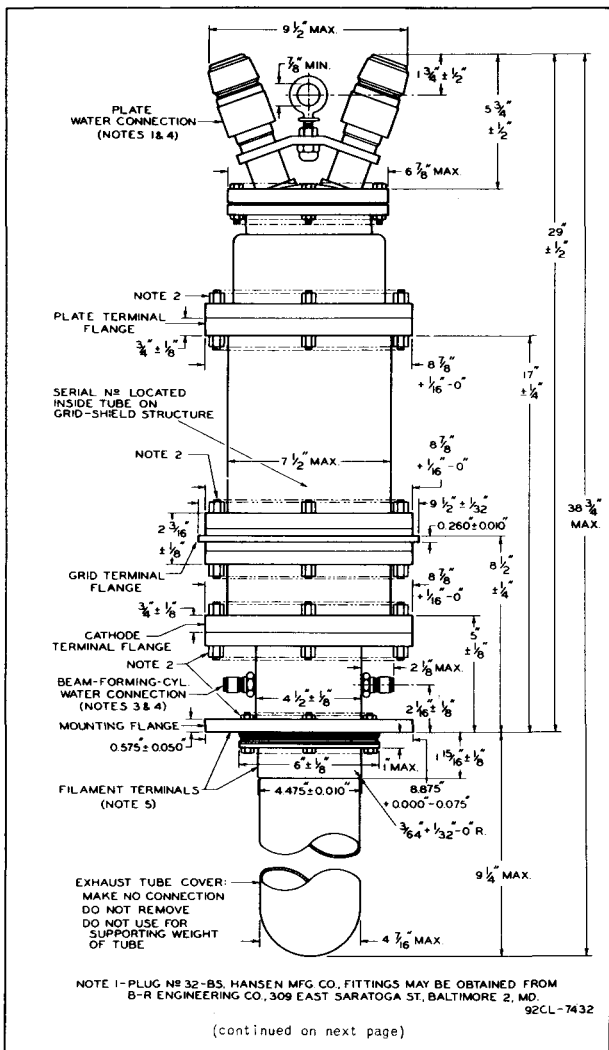
higher frequencies have not yet been determined. If operation of the 5831 is contemplated at a higher frequency, write for operating recommendations to Commercial Engineering, RCA, Harrison, N.J., giving complete details as to the proposed service.



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MAY 1, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7432A

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NOTE 2-DO NOT TAMPER WITH BOLTS

NOTE 3-PLUG N^o 4T-25, HANSEN MFG. CO. (SEE NOTE 1)

NOTE 4-DIRECTION OF WATER FLOW THROUGH TUBE SHOULD BE IN DIRECTION INDICATED BY MARKINGS AT WATER CONNECTIONS

NOTE 5-USE FOR FILAMENT POWER ONLY. CIRCUIT RETURNS SHOULD BE MADE TO CATHODE TERMINAL FLANGE

MAY 1, 1950

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CE-7432B

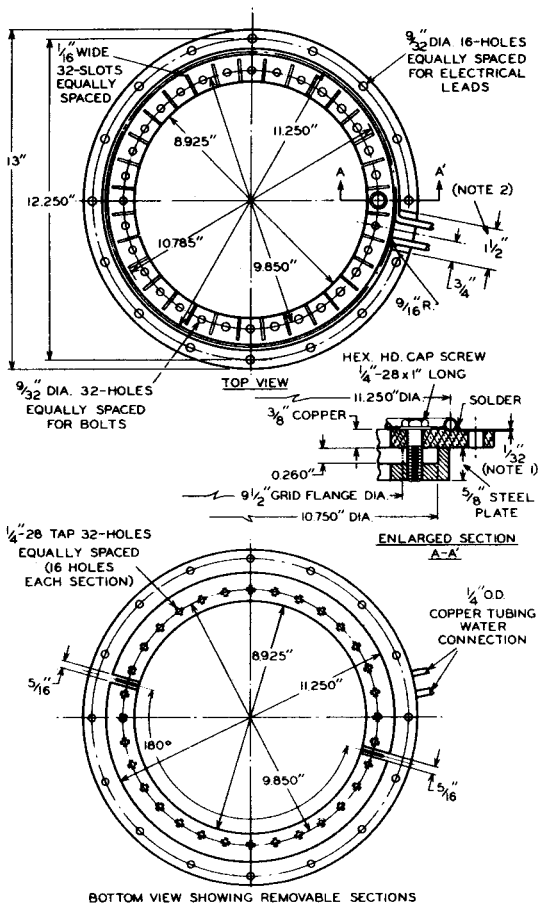


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DETAILS OF WATER-COOLED GRID-FLANGE CONNECTOR

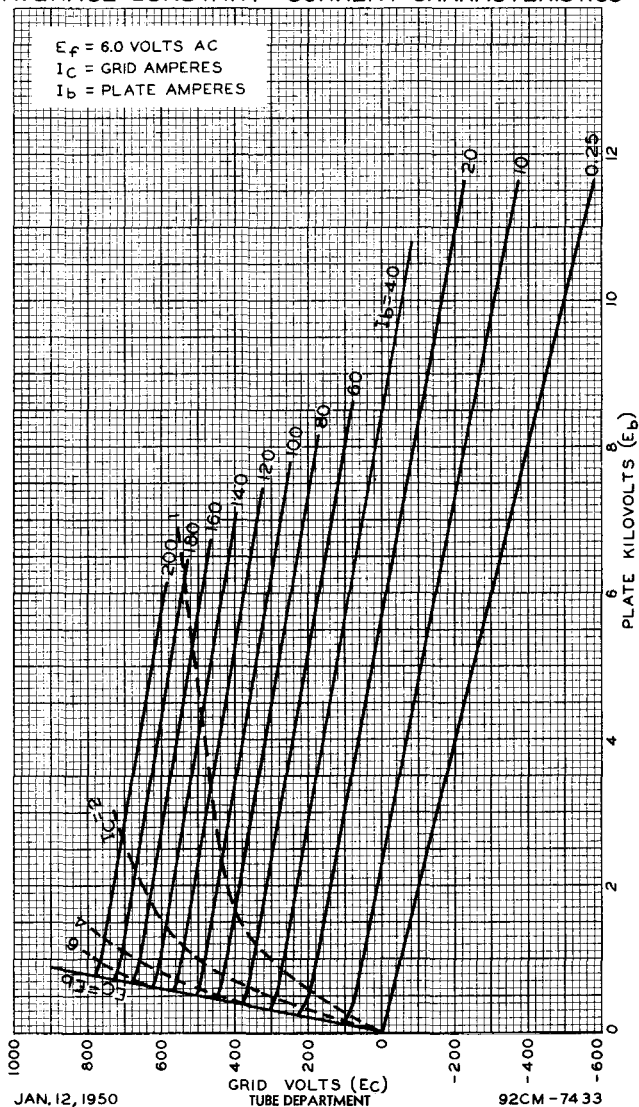


NOTE 1-CUT CIRCULAR GROOVE, 1/8" RADIUS, 1/32" DEEP FOR TUBING
 NOTE 2-END MILL 1/32" DEEP FOR TUBING BEND

92CL-7443

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$E_f = 6.0$ VOLTS AC
 $I_C =$ GRID AMPERES
 $I_b =$ PLATE AMPERES



JAN. 12, 1950

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM - 74 33