



5831

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SUPER-POWER BEAM TRIODE

WATER COOLED

GENERAL DATA

Electrical:

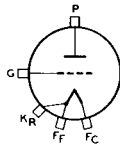
Filament, Multistrand Thoriated Tungsten:

| | | |
|-------------------------------------|--|------------------|
| 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 | $\mu\mu\text{f}$ |
| Grid to Filament | 600 | $\mu\mu\text{f}$ |
| Plate to Filament | 8 | $\mu\mu\text{f}$ |

Mechanical:

Terminal Connections:

- F_C - Filament Cylindrical Terminal
- F_F - Filament Flange Terminal



- K_R - Cathode Flange Terminal For Circuit Returns
- G - Grid Flange Terminal
- P - 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 gpm | Pressure Drop \oplus psi | Max. Gauge Pressure* psi |
|---|------------------|-------------------------------|-----------------------------|
| 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. | $^{\circ}\text{C}$ |

\oplus 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.

MAY 1, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1



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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

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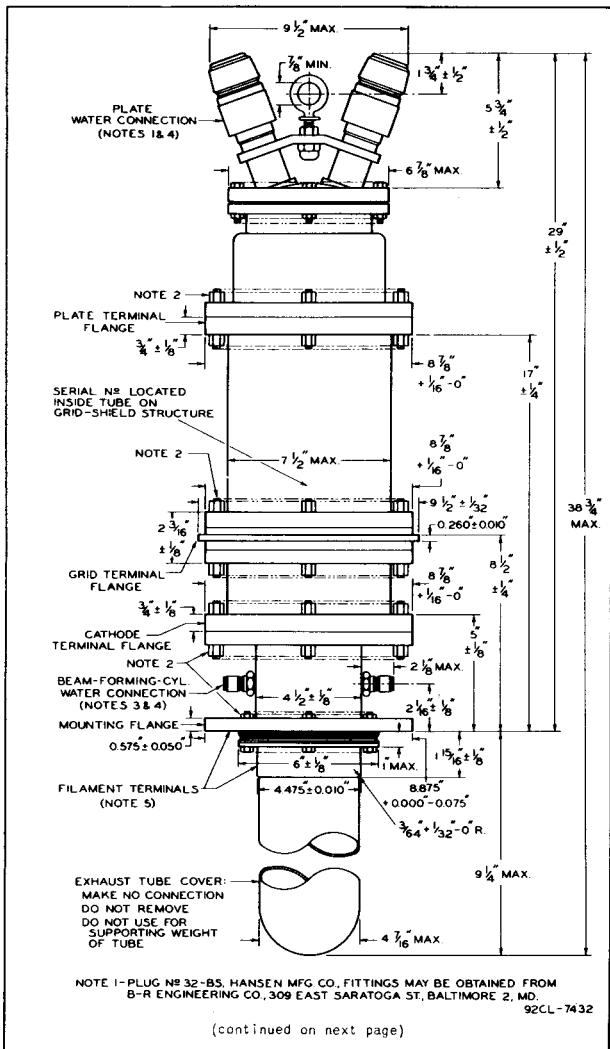
higher frequencies have not yet been determined. If operation of the 5831 is contemplated at a higher frequency, write for operating recommendations to Commercial Engineering, RCA, Harrison, N.J., giving complete details as to the proposed service.



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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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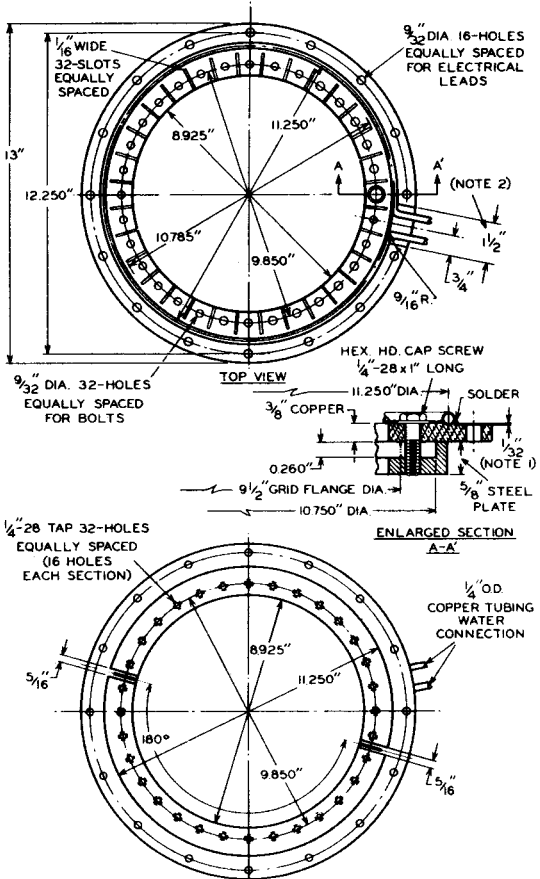


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DETAILS OF WATER-COOLED GRID-FLANGE CONNECTOR



BOTTOM VIEW SHOWING REMOVABLE SECTIONS

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

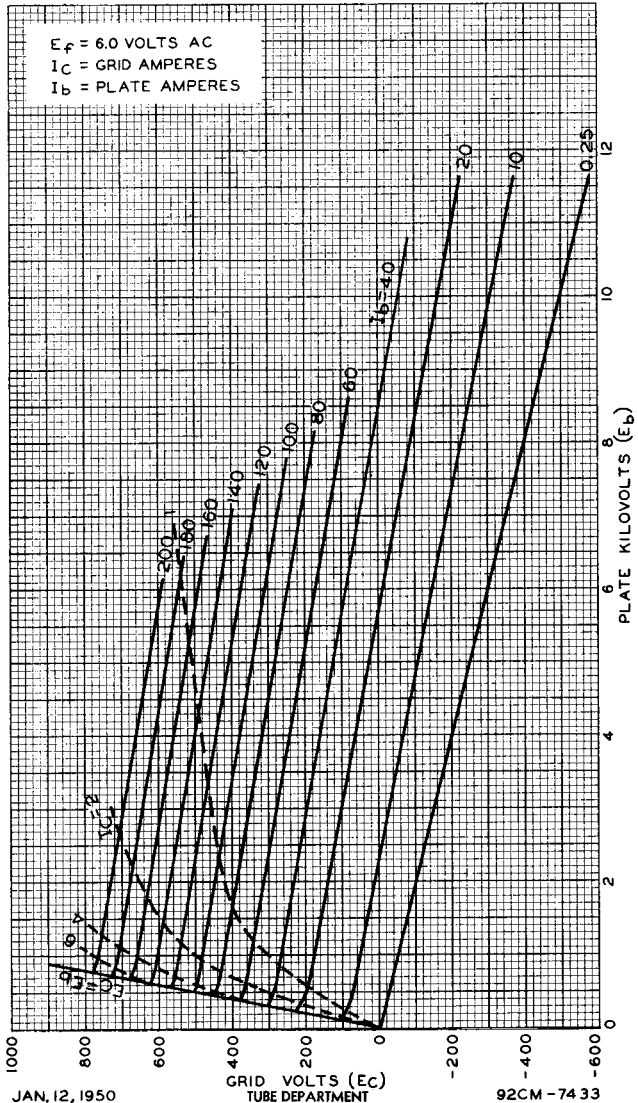
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AVERAGE CONSTANT - CURRENT CHARACTERISTICS



JAN, 12, 1950

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