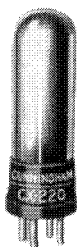


# Cunningham RADIO TUBES

## CX-220

### POWER AMPLIFIER



The '20 is a three-electrode, high-vacuum, power amplifier tube designed for operation from dry-cells. It is intended for use in the last audio stage of dry-battery-operated receivers using the '99 and/or '22.

### CHARACTERISTICS

|                                  |             |              |
|----------------------------------|-------------|--------------|
| FILAMENT VOLTAGE (D. C.) .....   | 3.0-3.3     | Volts        |
| FILAMENT CURRENT .....           | 0.125-0.132 | Ampere       |
| PLATE VOLTAGE .....              | 90 135 max. | Volts        |
| GRID VOLTAGE .....               | -16.5 -22.5 | Volts        |
| PLATE CURRENT .....              | 3.0 6.5     | Milliamperes |
| PLATE RESISTANCE .....           | 8000 6300   | Ohms         |
| AMPLIFICATION FACTOR .....       | 3.3 3.3     |              |
| MUTUAL CONDUCTANCE .....         | 415 525     | Micromhos    |
| LOAD RESISTANCE .....            | 9600 6500   | Ohms         |
| UNDISTORTED POWER OUTPUT .....   | 45 110      | Milliwatts   |
| GRID-PLATE CAPACITANCE .....     | 4.1         | μf.          |
| GRID-FILAMENT CAPACITANCE .....  | 2.0         | μf.          |
| PLATE-FILAMENT CAPACITANCE ..... | 2.3         | μf.          |
| MAXIMUM OVERALL LENGTH .....     |             | 4 1/8"       |
| MAXIMUM DIAMETER .....           |             | 1 3/16"      |
| BULB (See page 42, Fig. 1) ..... |             | T-8          |
| BASE .....                       |             | Small 4-Pin  |

### INSTALLATION

The base pins of the '20 fit the standard four-contact socket. The socket should be installed to operate the tube in a vertical position. For socket connections, see page 39, Fig. 1.

The filament in this tube is designed for operation with three No. 6 dry-cells connected in series. In multi-tube receivers the use of six or nine No. 6 dry-cells connected in series-parallel to give 4.5 volts will decrease the current drain per cell and give a more stable source of filament power. If storage battery operation is preferred, a four-volt storage battery may be used. In any case, a filament rheostat should be provided to maintain the voltage applied to the filament within the stated range.

### APPLICATION

For power amplifier service, the '20 will give greatest power output when operated at a plate voltage of 135 volts and the corresponding grid bias of -22.5 volts. At 90 volts on the plate and with a corresponding grid bias of -16.5 volts, good quality of reproduction may be obtained at a lower level of power output.

In receivers employing tubes of the 3.3 volt filament type, the use of the '20 in the output stage will be found desirable.