

# T-20

GENERAL  
PURPOSE  
TRIODE

**\$2.25**



# TZ-20

ZERO BIAS  
TRIODE

**\$2.25**

## 20 WATTS PLATE DISSIPATION

Two triodes offering outstanding value to Amateurs. The T-20 is recommended as an extremely fine amplifier tube on all frequencies up to 60MC. The TZ-20 is designed for zero bias class B audio operation and for efficient frequency multiplying performance.

### GENERAL CHARACTERISTICS

	T-20	TZ-20
Filament Voltage, volts.....	7.5	7.5
Filament Current, amps.....	1.75	1.75
Plate Resistance, ohms.....	8000	26,700
Mutual Conductance, uMhos.....	2500	2600
Amplification Factor.....	20	62
Max. Length, inches.....		6½
Max. Diameter, inches.....		2½

UX Ceramic Base

Plate to Grid, mmf..... 4

### T-20—CLASS "C" AMPLIFIER—TZ-20

Max. Operating Plate Volts	
Unmodulated DC, volts.....	750
Modulated DC, volts.....	750
Max. DC Plate Current, mills.....	75
Max. DC Grid Current, mills.....	25
Max. Plate Dissipation, watts.....	20
Max. RF Grid Current, amps.....	2.5
RF Output, watts.....	42
Percentage of Efficiency.....	75%

### TZ-20—CLASS "B" A.F. MODULATOR DATA

#### VALUES FOR TWO TUBES

DC Plate Voltage.....	800	600
Bias.....	0	0
Peak AF Grid to Grid Voltage.....	160V	160V
Zero Signal DC Plate Current.....	40 MA	28 MA
Max. signal Plate Current.....	136 MA	140 MA
Plate to Plate Load.....	12,000-OHMS	8,100-OHMS
Average Driving Power.....	1.8 WATTS	1.8 WATTS
Power output.....	70 WATTS	50 WATTS

## OPERATING DATA—T-20—TZ-20

T-20's and TZ-20's require a minimum amount of excitation and their ratings are conservative. While the rated plate dissipation is 20 watts, no color shows on the plate until the dissipation amounts to approximately 32 watts and it takes about 45 watts to cause a cherry red spot in the center of the plate. To obtain best efficiency with a minimum of harmonics, we recommend that certain values of capacities be used in the plate tank and the tank coils should be proportioned to hit resonance at the operating frequencies with that amount of tuning capacity across the circuit. These capacities should be the actual amount of tank condenser in the circuit across the entire plate tank. A higher value of C will result in lower tank impedance and lower efficiency. Lower values of C will result in slightly higher efficiency, but this will be offset by increased harmonic content as well as poor linearity if the stage is modulated for fone. These values will hold for both single ended and push-pull amplifiers.

1715 KC — 160 MMFD	14000 KC — 20 MMFD
3500 KC — 80 MMFD	28000 KC — 10 MMFD
7000 KC — 40 MMFD	56000 KC — 5 MMFD

Under these conditions with an input of 750 volts 75 MA per tube the efficiency should be approximately 75% and the output 42 watts per tube. For one tube, the recommended grid bias resistor would be 6000 ohms. Half that value or 3000 ohms would be correct for two tubes, parallel or push-pull. For CW or buffer operation, the DC grid current should be 12 MA or more and for phone operation should be 17 MA or more per tube. Under no conditions should the DC grid current per tube, exceed the rated value of 25 MA. Expressed in terms of power approximately 2.5 watts of drive are required for CW or buffer operation or 5 watts for fone operation. This means that the tube may be driven to full output directly from the crystal oscillator stage.

The TZ20 is primarily designed for zero bias Class B audio operation and no bias is required for such operation at voltages up to 800. It is the ideal Class B audio tube for outputs up to 70 watts and 4 of them push pull parallel will form a most economical 140 watt modulator. For pushpull parallel operation the reflected load impedance will be half and the output twice that for two tubes. The Class B operating conditions for the T20 and TZ20 are identical but the TZ20 avoid the necessity for a source of grid bias with good voltage regulation. At 800 volts the no-signal plate current to a pair of TZ20's will be approximately 25 to 30MA.

If the TZ20 is used as an RF amplifier the information on the T20 above will apply except that somewhat less bias is necessary. For one TZ20 the bias resistor should be 4000 ohms. Half that value or 2000 ohms would be correct for two tubes push pull or parallel.

The TZ20 is a more efficient doubler than the T20 and is recommended for this purpose. As a doubler the bias resistor should be 6000 ohms or higher. Efficient doubler operation requires large amounts of grid drive.

**CAUTION:** These tubes have metal plates and do not have the carbon anode which is characteristic of all other TAYLOR Transmitting Tubes. This does not mean that they will be any less efficient but it does mean that they will not stand as much abuse. The plate voltage should be reduced while making adjustments to prevent excessive heating. Properly handled, the efficiency of these tubes will be as great as though they had carbon anodes and their life will be equally as long.

## CLASS B AUDIO DATA - - - TZ-20 - - - T-20

The chart at right gives proper Class B Audio operating conditions for various outputs at different plate voltages. The most important value is the reflected load impedance which is given for the entire primary or plate to plate. The current value is the maximum average value as would be indicated on the plate current meter with sine wave input. For the same peak output with voice input the maximum average plate current will be approximately 50% to 60% of this value. The correct bias 35 volts will limit the T-20 no-signal plate current to between 10 and 15 MA per tube. The TZ-20 requires no bias voltage.

D.C. Plate Voltage ↓	40	50	60	70	←Audio Watts Output
800	78MA 21,000	98MA 17,000	117MA 14,000	137MA 12,000	←Max. Av. Ip. ←Plate to plate load
700	92MA 15,000	115MA 12,000	140MA 10,000		←Max. Av. Ip. ←Plate to plate load
600	113MA 10,200	140MA 8,100			←Max. Av. Ip. ←Plate to plate load