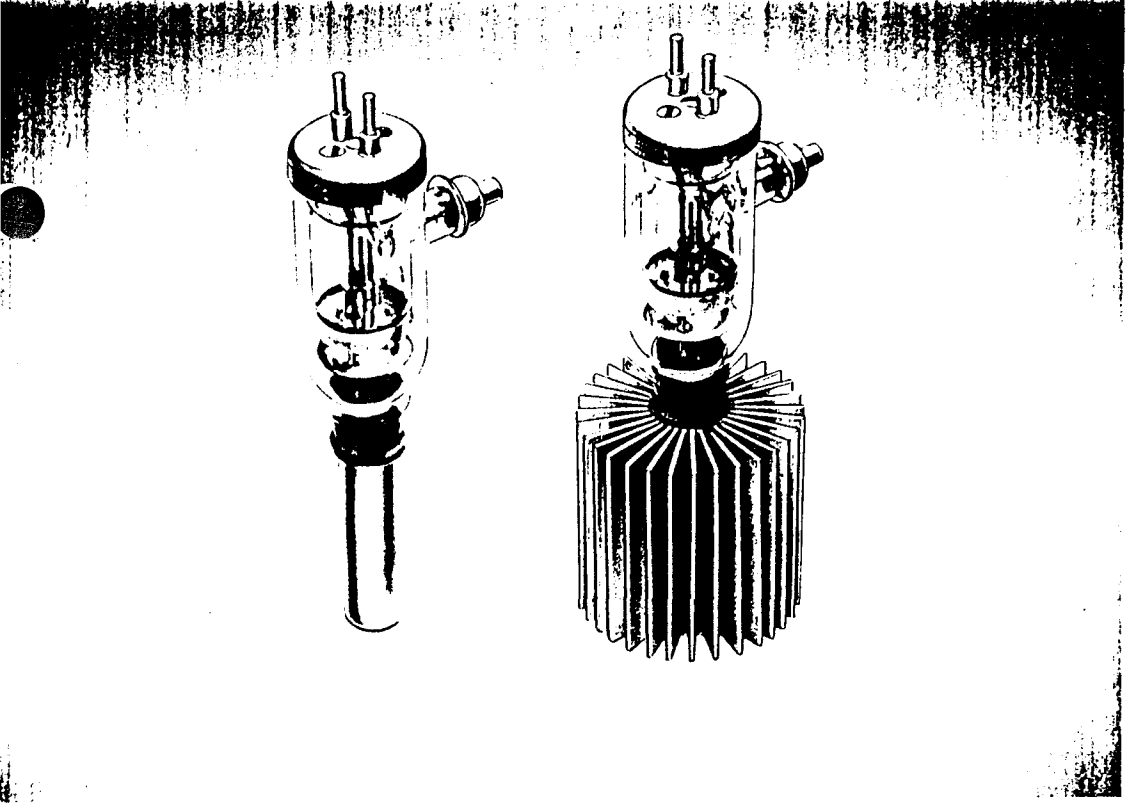


MACHLETT

ML-343A
ML-343AA

DESCRIPTION AND RATINGS

DESCRIPTION

The ML-343A and ML-343AA are three-electrode tubes designed for use as modulators, amplifiers, or oscillators in radio-transmitting service. The cathode of each type is a pure-tungsten filament. The anode of the ML-343A is water-cooled and is capable of dissipating 10 kW. The anode of the ML-343AA is air-cooled and is capable of dissipating 5 kW. The maximum rating of 18 kVdc applies at frequencies up to 4 Mc; operation at 16 Mc is permissible with plate voltage reduced to 5 kVdc.

GENERAL CHARACTERISTICS

Electrical		
Filament Voltage	21.5	volts
Filament Current at 21.5 volts	57.5	amperes
Filament Starting Current	90	amps
Filament Cold Resistance	.0317	ohms
Amplification Factor	40	
Grid-Plate Transconductance	6750	uMhos
Interelectrode Capacitances		
Grid-Plate	23.5	uuf
Grid-Filament	20.0	uuf
Plate-Filament	1.9	uuf

	ML-343A	ML-343AA
Mechanical		
Mounting Position	Vertical anode down	
Type of Cooling	Water	Forced-air
Coolant flow on anode	3 gpm	600 cfm
Maximum outgoing water temperature	75 °C	—
Maximum Water Pressure	80 psi	—
Maximum Anode Temperature	—	120 °C
Net Weight, approximate	4.3 lbs	35 lbs

MAXIMUM RATINGS

VALUES APPLY TO BOTH TYPES UNLESS OTHERWISE SPECIFIED

	ML-343A	ML-343AA	
Direct Plate Voltage	18,000	18,000	volts
Direct Plate Current	2	1.5	amps
Plate Dissipation	10,000	5000	watts
Grid Dissipation	200	200	watts
R-F Grid Current	20	20	amps
Frequency	4	4	Mc

The above are maximum ratings which do not apply simultaneously but depend on the type of service specified below.

TYPICAL OPERATING CONDITIONS

Class A Audio Amplifier or Modulator

Direct Plate Voltage	12,500	10,000	volts
Grid Bias	—170	—130	volts
Direct Plate Current	0.40	0.30	amp
Plate Dissipation	5000	3000	watts
Load Impedance	12,000	20,000	ohms
Undistorted Output	650	400	watts

Class B Audio Amplifier or Modulator

(for balanced 2 tube circuit)

Direct Plate Voltage	12,500	10,000	volts
Grid Bias	—200	—150	volts
Direct Plate Current per tube			
No Drive	0.25	0.22	amp
Maximum Drive	1.3	1.3	amps
Plate Dissipation (per tube)	5000	5000	watts
Load Resistance (plate-to-plate)	8600	7600	ohms
Load Resistance (per tube)	2150	1900	ohms
Approximate Maximum Output—2 tubes	18,000	15,000	watts
Recommended Power for Driving Stage	750	750	watts

Class B Radio-Frequency Amplifier

Direct Plate Voltage	15,000	12,500	volts
Direct Plate Current for Carrier Conditions	0.70	0.70	amp
Grid Bias	—350	—300	volts
Approximate Carrier Watts for Use with 100% Modulation	3500	2900	watts

Class C Radio-Frequency Oscillator or Power Amplifier—Unmodulated

	ML-343A	ML-343AA		
Direct Plate Voltage	18,000	15,000	12,500	volts
Direct Plate Current	1.25	1.00	1.25	amps
Grid Bias	—600 to —800	—500 to —700	—450 to —600	watts
Nominal Power Output	15,000	10,000	10,000	watts
Plate Dissipation	10,000	5000	5600	watts

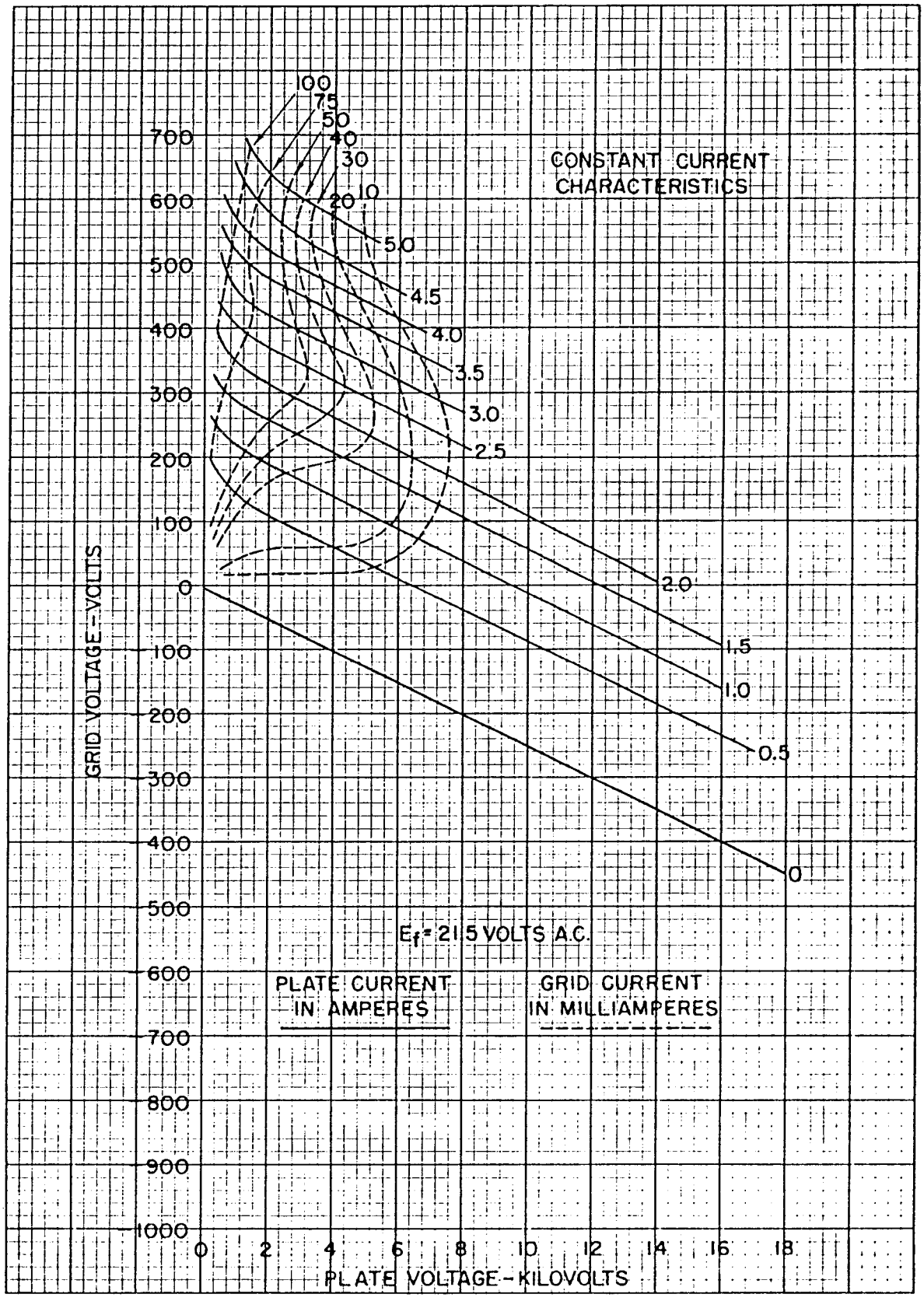
Class C Radio-Frequency Amplifier—Plate Modulated

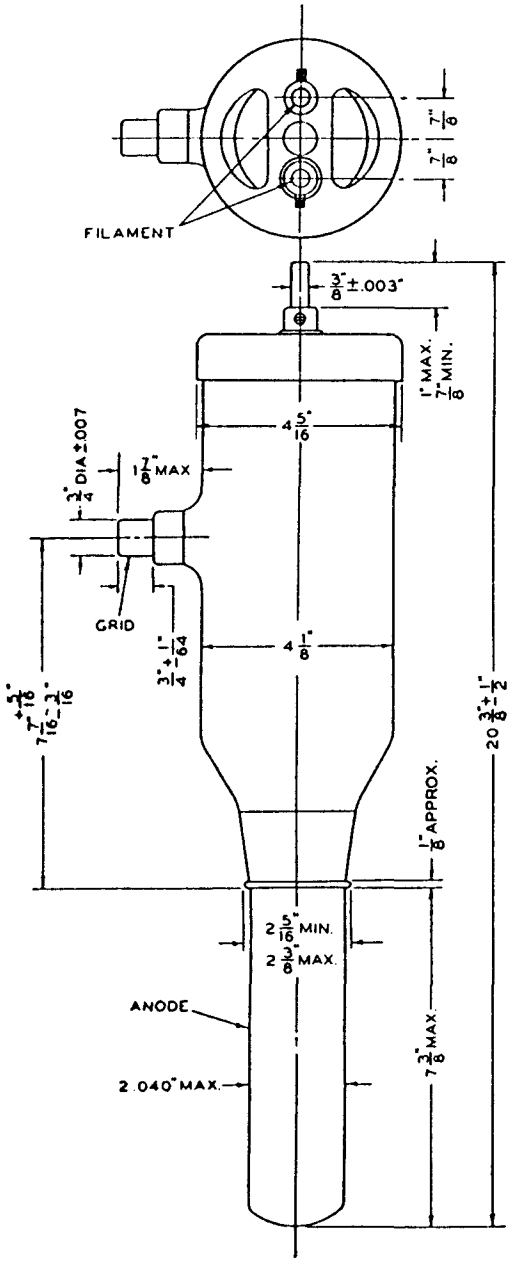
Direct Plate Voltage	7500	5000	volts
Direct Plate Current	1.0	1.0	amp
Grid Bias	—400	—300	volts
Direct Grid Current	150	150	mA
Nominal Carrier Power Output	5000	3300	watts

APPLICATION NOTES

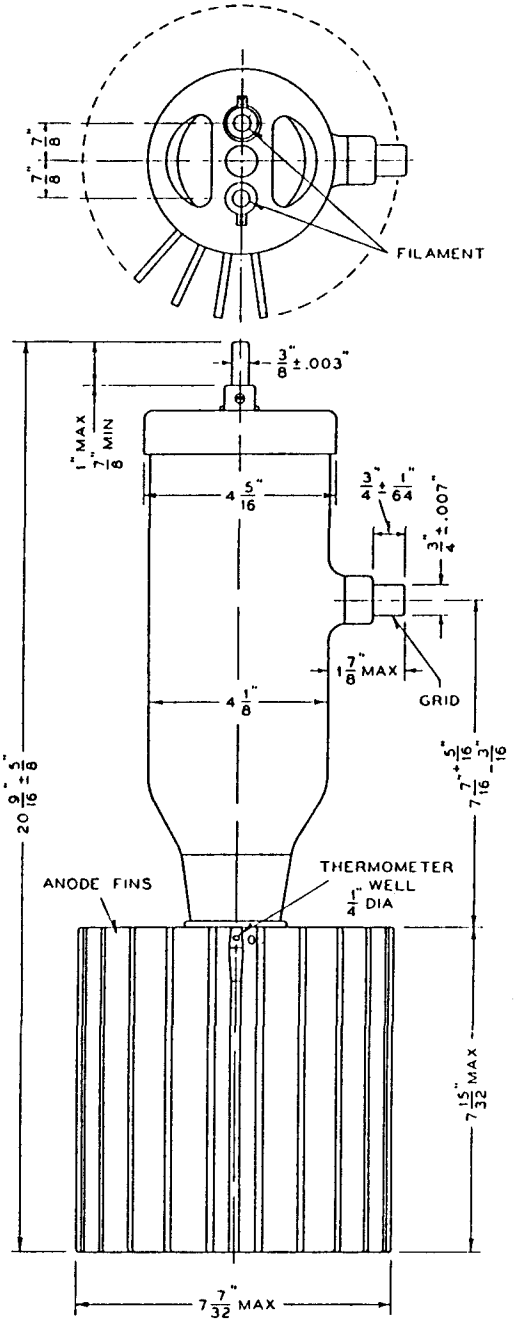
Maximum ratings apply at frequencies of 4 megacycles and less. The maximum plate voltage for the upper frequency limit of 16 megacycles is 5,000 volts. The maximum plate voltage for frequencies between 4 and 16 megacycles should be proportionately reduced.

The cooling facilities for the ML-343AA should be such that the temperature of the anode, indicated by a thermometer having a non-metallic column mounted in the tube thermometer well with the bulb protected from the air stream, is less than 120°C. The amount of air required will vary from 400 to 600 cubic feet per minute depending upon the anode dissipation and ambient temperature. An air pressure interlock is required for protecting the tube if the air flow is insufficient. The interlock should be adjusted to remove all voltages from the tube in case of failure of the forced air supply. In no case should the rate of flow be such that under prolonged operation at conditions of maximum dissipation the temperature rises above 120°C. The forced air shall be supplied at the bottom so that the air is forced upward through the anode fins.


CONSTANT CURRENT CHARACTERISTICS
100
75
50
40
30
20
10
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
700
600
500
400
300
200
100
0
-100
-200
-300
-400
-500
-600
-700
-800
-900
-1000
GRID VOLTAGE-VOLTS
E_f = 21.5 VOLTS A.C.
PLATE CURRENT IN AMPERES
GRID CURRENT IN MILLIAMPERES
0
2
4
6
8
10
12
14
16
18
PLATE VOLTAGE-KILOVOLTS



DIMENSIONS — ML-343A



DIMENSIONS — ML-343AA

MACHLETT LABORATORIES, INC.

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