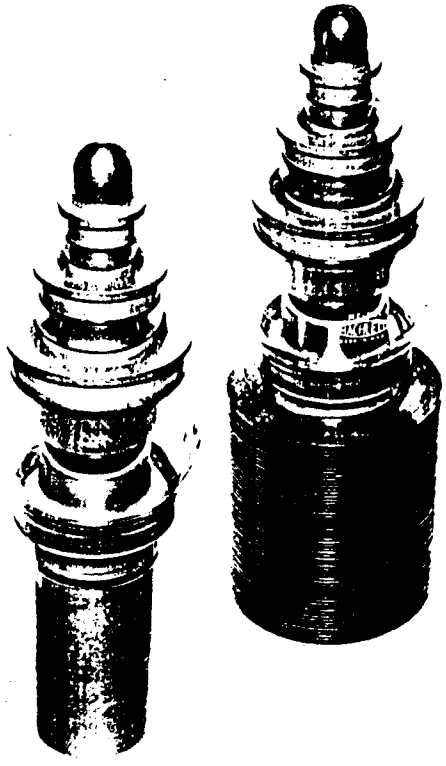


MACHLETT

# ML-7120
# ML-7121

DESCRIPTION & RATINGS

## DESCRIPTION

The ML-7120 and ML-7121 are low-mu, three-electrode tubes designed specifically for use as Class AB1 linear amplifiers or modulators. The ML-7120 and ML-7121 are mechanically equivalent to the ML-6420 and ML-6421, respectively. The cathode of each type is a sturdy, self-supporting, stress-free, thoriated-tungsten filament. The ML-7120 has a water-cooled, heavy-wall anode capable of dissipating 12.5 kW with a water flow of approximately 5 gpm. The ML-7121 has a forced-air-cooled, heavy-wall anode capable of dissipating 10 kW with an air flow of approximately 475 cfm*. Maximum ratings of 10 kVdc plate voltage and 20 kW plate input apply at frequencies up to 30 Mc.

## GENERAL CHARACTERISTICS

### Electrical

| | | |
|---|---|---|
| Filament Voltage | 7.0 | Volts |
| Filament Current | 85 | Amps |
| Filament Starting Current, maximum | 400 | Amps |
| Filament Cold Resistance | 0.0095 | Ohm |
| Amplification Factor | 4.4 | |
| Interelectrode Capacitances: | | |
| Grid-Plate | 23 | $\mu\mu f$ |
| Grid-Filament | 32 | $\mu\mu f$ |
| Plate-Filament | 1.7 | $\mu\mu f$ |

### Mechanical

| | | |
|---|---|---|
| Mounting Position | | Vertical, anode down |
| Type of Cooling — ML-7120 | | Water and Forced air† |
| Water flow on anode, minimum for 12.5 kW dissipation | | 5 gpm |
| Maximum outgoing water temperature | | 70 °C |
| Type of Cooling — ML-7121 | | Forced-air |
| Air flow on anode, minimum for 10 kW dissipation * | Pressure: | 475 cfm at 3.3" water |
| | Exhaust: | 550 cfm at 3.5" water |
| Maximum incoming air temperature | | 50 °C |
| Maximum Glass Temperature | | 165 °C† |
| Net Weight, approximate | | |
| ML-7120 | | 10 lbs. |
| ML-7121 | | 13.5 lbs. |

*When used with Machlett ML-7121 Air Distributor F-17796.

†At frequencies up to 15 Mc, normal cabinet ventilation should be sufficient; at higher frequencies or high ambient temperature, auxiliary air flow of 25-50 cfm may be required and should be distributed to maintain uniform glass temperature, not greater than 165°C, around the circumference of the seals.

## MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

(Continuous Commercial Service)

VALUES APPLY TO BOTH TYPES UNLESS OTHERWISE SPECIFIED

### Audio-Frequency Power Amplifier and Modulator Class AB1

| | | | | |
|---|---|---|---|---|
| Maximum Ratings, Absolute Values | | | | |
| D-C Plate Voltage | | | 10000 | volts |
| Max.-Signal D-C Plate Current | | | 2.2 | amps |
| Max.-Signal Plate Input | | | 20 | kW |
| Plate Dissipation | | | | |
| ML-7120 | | | 12.5 | kW |
| ML-7121 | | | 10 | kW |
| Typical Operation (Values are for two tubes) | | | | |
| D-C Plate Voltage | 6000 | 8500 | 10000 | volts |
| D-C Grid Voltage | −1450 | −2050 | −2350 | volts |
| Peak A-F Grid-to-Grid Voltage | 2800 | 4000 | 4600 | volts |
| Peak A-F Plate-to-Plate Voltage | 8600 | 13000 | 12800 | volts |
| Zero-Signal D-C Plate Current | 0.2 | 0.4 | 0.6 | amp |
| Max.-Signal D-C Plate Current | 1.2 | 1.6 | 4.2 | amps |
| Effective Load Resistance, Plate-to-Plate | 9150 | 10400 | 3900 | ohms |
| Max.-Signal Driving Power | 0 | 0 | 0 | watts |
| Max.-Signal Power Output, approximate | 4.0 | 8.1 | 21 | kW |

| | | | |
|---|---|---|---|
| Typical Operation (Values are for two tubes) | | | |
| Random Noise Drive Conditions | ML-7120 | | |
| D-C Plate Voltage | 10000 | 10000 | volts |
| D-C Grid Voltage | −2350 | −2350 | volts |
| Peak A-F Grid-to-Grid Voltage | 4650 | 4650 | volts |
| Peak A-F Plate-to-Plate Voltage | 15200 | 15800 | volts |
| Zero-Signal D-C Plate Current | 0.6 | 0.6 | amp |
| Max.-Signal D-C Plate Current | 2.5 | 2.0 | amps |
| Effective Load Resistance, Plate-to-Plate | 7750 | 10000 | ohms |
| Max.-Signal Driving Power | 0 | 0 | watts |
| Max.-Signal Power Output at 1.0 Power Factor | 15 | 12.5 | kVA |
| Load Power Factor | 0-1.0 | 0-1.0 | |

### Linear RF Power Amplifier — Class AB

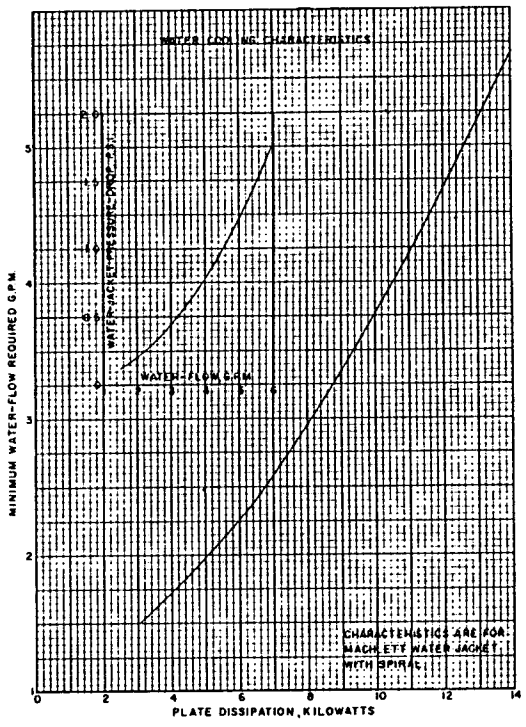
Single-Sideband Suppressed-Carrier Service

| | | |
|---|---|---|
| Maximum Ratings, Absolute Values | | |
| D-C Plate Voltage | 10000 | volts |
| Max.-Signal DC Plate Current | 2.2 | amps |
| Max.-Signal Plate Input | 20 | kW |
| Max.-Signal DC Grid Current | 100 | mA |
| Plate Dissipation | | |
| ML-7120 | 12.5 | kW |
| ML-7121 | 10 | kW |
| Typical Operation | | |
| DC Plate Voltage | 10000 | volts |
| DC Grid Voltage | −2350 | volts |
| Zero-Signal DC Plate Current | 0.3 | amp |
| Effective RF Load Resistance | 3050 | ohms |
| Single-Tone Modulation | | |
| Max.-Signal DC Plate Current | 1.5 | amps |
| Max.-Signal DC Grid Current | 0 | mA |
| Max.-Signal Peak RF Plate Voltage | 7200 | volts |
| Max.-Signal Peak RF Grid Voltage | 2325 | volts |
| Max.-Signal Driving Power | 0 | watts |
| Max.-Signal Plate Power Output | 8.5 | kW |
| Two-Tone Modulation | | |
| Average DC Plate Current | 0.95 | amp |
| Average DC Grid Current | 0 | mA |
| Max.-Resultant Signal Peak RF Grid Voltage | 2325 | volts |
| Average Plate Power Output | 4.25 | kW |
| Peak Envelope Plate Power Ouput | 8.5 | kW |

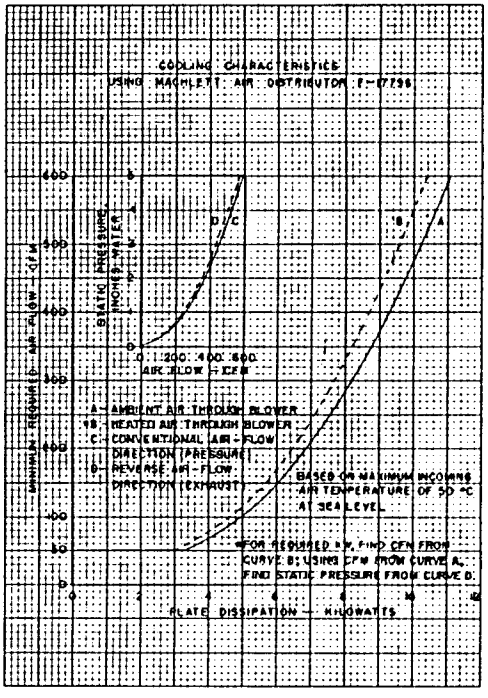
## CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

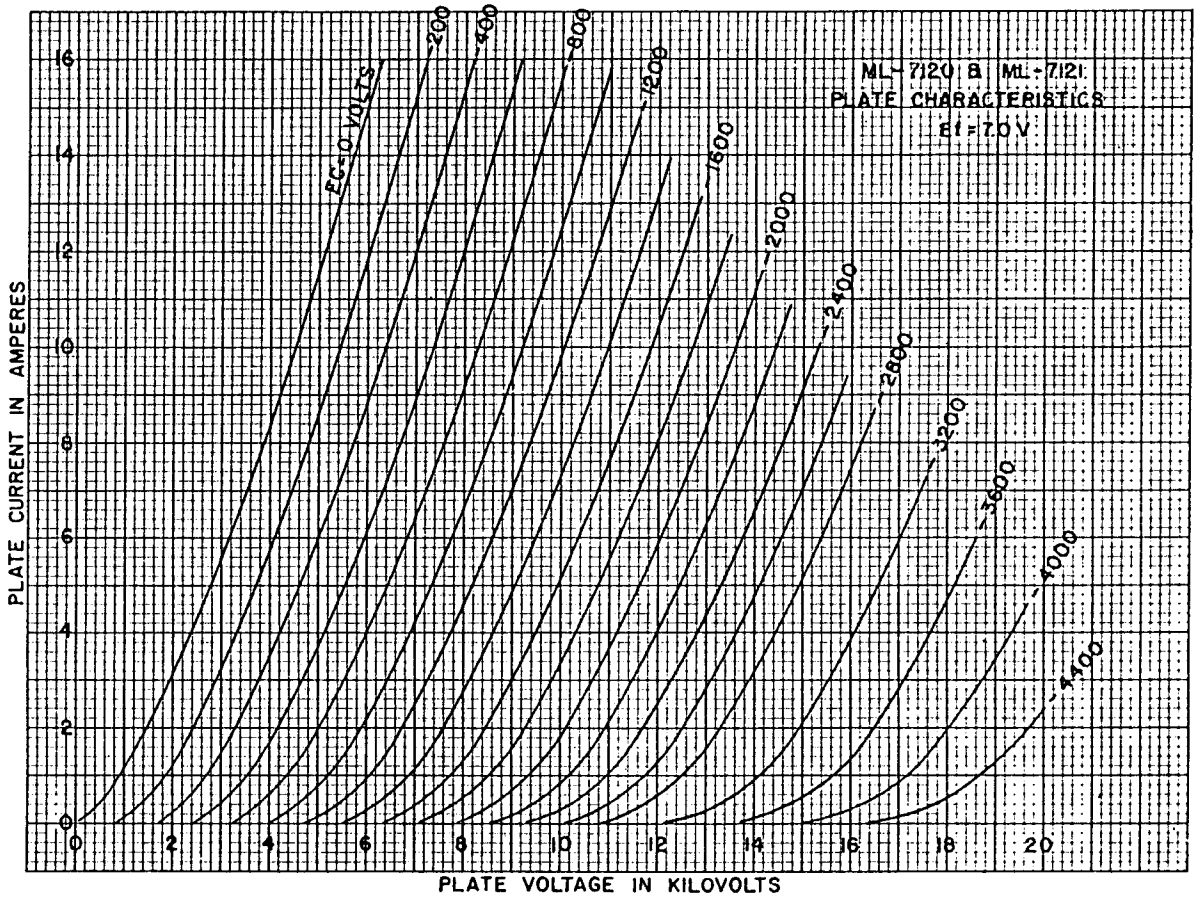
| Characteristic | Conditions | | Limits Minimum | Bogey | Maximum | |
|---|---|---|---|---|---|---|
| Plate Voltage | $e_c$ = 0 volts; $i_b$ = 15 amps | $e_b$: | —— | 6.0 | 6.4 | kv |
| Plate Voltage | $E_c$ = 0 Vdc; $I_b$ = 1.0 Adc | $E_b$: | 0.7 | 0.85 | 1.0 | kVdc |
| Plate Voltage | $E_c$ = −1000 Vdc; $I_b$ = 1.0 Adc | $E_b$: | 4.9 | 5.25 | 5.6 | kVdc |
| Grid Voltage | $E_b$ = 7.0 kVdc; $I_b$ = 0.020 Adc | $E_c$: | −1600 | −1800 | −2000 | Vdc |
| Plate Power Output | $E_b$ = 10.0 kVdc; $I_b$ = 1.5 Adc<br>$E_c$ = −2350 Vdc; $I_c$ = 0 Adc | $P_o$: | 7.5 | 8.5 | —— | kW |

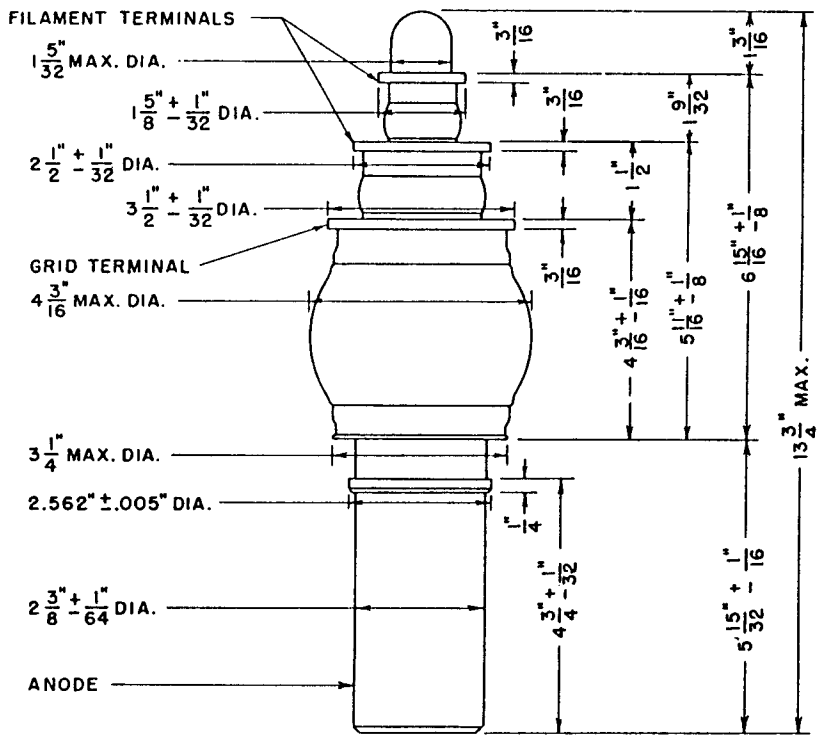
ML-7120



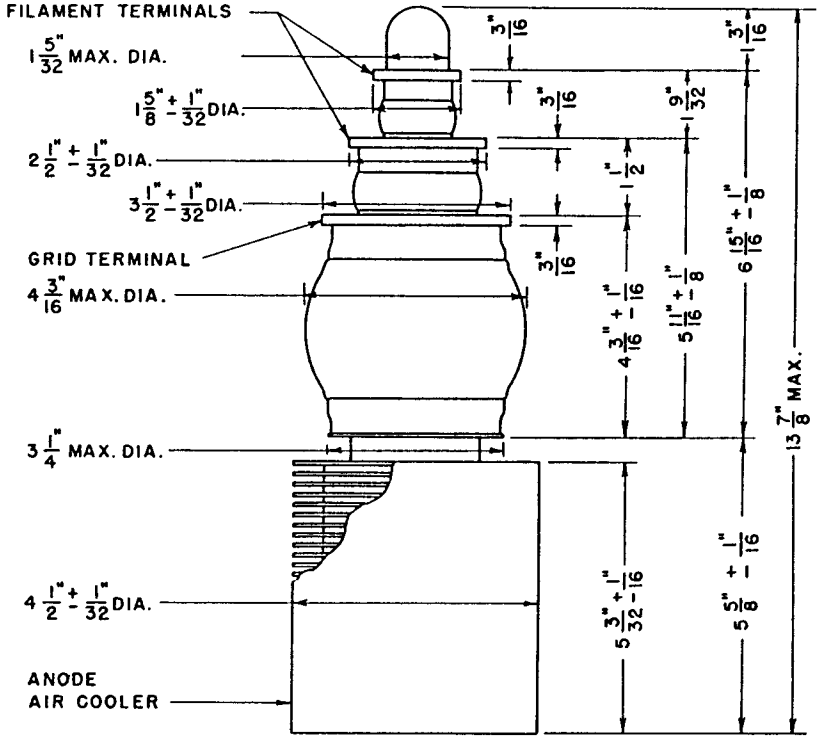

ML-7121






DIMENSIONS — ML-7120




DIMENSIONS — ML-7121

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