

MACHLETT

ML-5666

ML-5667

DESCRIPTION & RATINGS

DESCRIPTION

The ML-5666 & ML-5667 are three electrode tubes designed specifically to meet the severe conditions of radio-frequency heating service. Their special designs also contribute to better performance when used as modulators, amplifiers or oscillators in communications equipment. The cathodes of these tubes are stress-free, pure tungsten filaments. Both tubes incorporate rigidly supported grid and filament assemblies, glass surfaces completely shielded against electron bombardment and filament radiation, and rugged Kovar anode, grid and filament seals. The ML-5666 supersedes the type 889A triode for industrial applications and will replace

it with minor equipment modifications. Its heavy-wall anode is water cooled and can dissipate 12.5 kW with moderate water flow. The ML-5667 supersedes the type 889RA triode for industrial applications and will replace it without equipment modifications. Its heavy-wall anode is forced-air cooled and can dissipate 7.5 kW with an air flow of 550 cfm. Maximum ratings of 10 kVdc plate voltage and 20 kW plate input apply at frequencies up to 22.5 Mc; operation at 50 Mc is permissible with voltage input reduced according to the table on page 2.

GENERAL CHARACTERISTICS

Electrical

Filament Voltage		11.0	Volts
Filament Current		120	Amps
Filament Starting Current, maximum		180	Amps
Filament Cold Resistance		0.0083	Ohms
Amplification Factor		21	
Interelectrode Capacitances			
Grid-Plate	ML-5666	ML-5667	
Grid-Filament	17.5	18.5	$\mu\mu f$
Plate-Filament	23.3	23.3	$\mu\mu f$
	2.7	3.0	$\mu\mu f$

Mechanical

Mounting Position	Vertical, anode down
Type of Cooling — ML-5666	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-5667	Forced-air
Air flow on anode, minimum for 7.5 kW dissipation	550 cfm
Maximum incoming air temperature	45 °C
Maximum Glass Temperature	160 °C
Air flow on center of dish from 3" nozzle	30 cfm*
Net Weight, approximate	
ML-5666	4 lbs.
ML-5667	40 lbs.

* At frequencies above 15 Mc, more air flow may be necessary; special attention should be given to adequate ventilation of the dish and seals to keep the temperature at the hottest point below 160°C. Heat radiating connectors for grid and filament posts are recommended.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

(Continuous Commercial Service)

VALUES APPLY TO BOTH TYPES UNLESS OTHERWISE SPECIFIED

**A-F Power Amplifier & Modulator
Class B**

Maximum Ratings, Absolute Values

D-C Plate Voltage	10000	volts
Max.-Signal D-C Plate Current*	2	amps
Max.-Signal Plate Input*	16	kW
Plate Dissipation*		
ML-5666	12.5	kW
ML-5667	7.5	kW

Typical Operation (Values are for 2 tubes)

D-C Plate Voltage	7500	volts
D-C Grid Voltage	-300	volts
Peak A-F Grid to Grid Voltage	1700	volts
Zero Signal D-C Plate Current	0.4	amp
Maximum Signal D-C Plate Current	3.2	amps
Effective Load Resistance (plate to plate)	5000	ohms
Maximum Signal Driving Power	150	watts
Maximum Signal Power Output	15	kW

* Averaged over any audio-frequency cycle of sine-wave form.

**Radio-Frequency Power Amplifier
Class B**

Carrier conditions per tube for use with a maximum modulation factor of 1.0

Maximum Ratings, Absolute Values

D-C Plate Voltage	10000	volts
D-C Plate Current	1.0	amp
Plate Input	10	kW
Plate Dissipation		
ML-5666	12.5	kW
ML-5667	7.5	kW

Typical Operation

D-C Plate Voltage	9000	volts
D-C Grid Voltage	-350	volts
Peak R-F Grid Voltage	450	volts
D-C Plate Current	0.8	amp
Driving Power, approx.†	110	watts
Power Output, approx.	2.5	kW

†At crest of audio-frequency cycle with modulation factor of 1.0.

**Plate Modulated R-F Power Amplifier
Class C Telephony**

Carrier conditions per tube for use with a maximum modulation factor of 1.0

Maximum Ratings, Absolute Values

D-C Plate Voltage	8000	volts
D-C Grid Voltage	-1500	volts
D-C Plate Current	1.0	amp
D-C Grid Current	0.35	amp
Plate Input	8	kW
Plate Dissipation		
ML-5666	8	kW
ML-5667	5	kW

Typical Operation

D-C Plate Voltage	6000	7500	volts
D-C Grid Voltage	-900	-1200	volts
Peak R-F Grid Voltage	1420	1700	volts
D-C Plate Current	1.0	0.88	amp
D-C Grid Current, approx.	0.1	0.08	amp
Driving Power, approx.	140	140	watts
Power Output, approx.	4	5	kW

**R-F Power Amplifier and Oscillator
Class C Telegraphy**

Key-down conditions per tube without amplitude modulation‡

Maximum Ratings, Absolute Values

D-C Plate Voltage	10000	volts
D-C Grid Voltage	-1500	volts
D-C Plate Current	2.0	amps
D-C Grid Current	0.35	amp
Plate Input	20	kW
Plate Dissipation		
ML-5666	12.5	kW
ML-5667	7.5	kW

Typical Operation

D-C Plate Voltage	6000	7500	9000	volts
Filament Voltage	10.6	10.7	10.8	volts
D-C Grid Voltage	-500	-600	-750	volts
Peak R-F Grid Voltage	1200	1400	1700	volts
D-C Plate Current	1.6	1.8	2.0	amps
D-C Grid Current, approx.	0.19	0.20	0.21	amp
Driving Power, approx.	220	270	340	watts
Power Output, approx.	6.3	8.9	12.2	kW

‡Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115% of the carrier conditions.

MAXIMUM FREQUENCY RATINGS

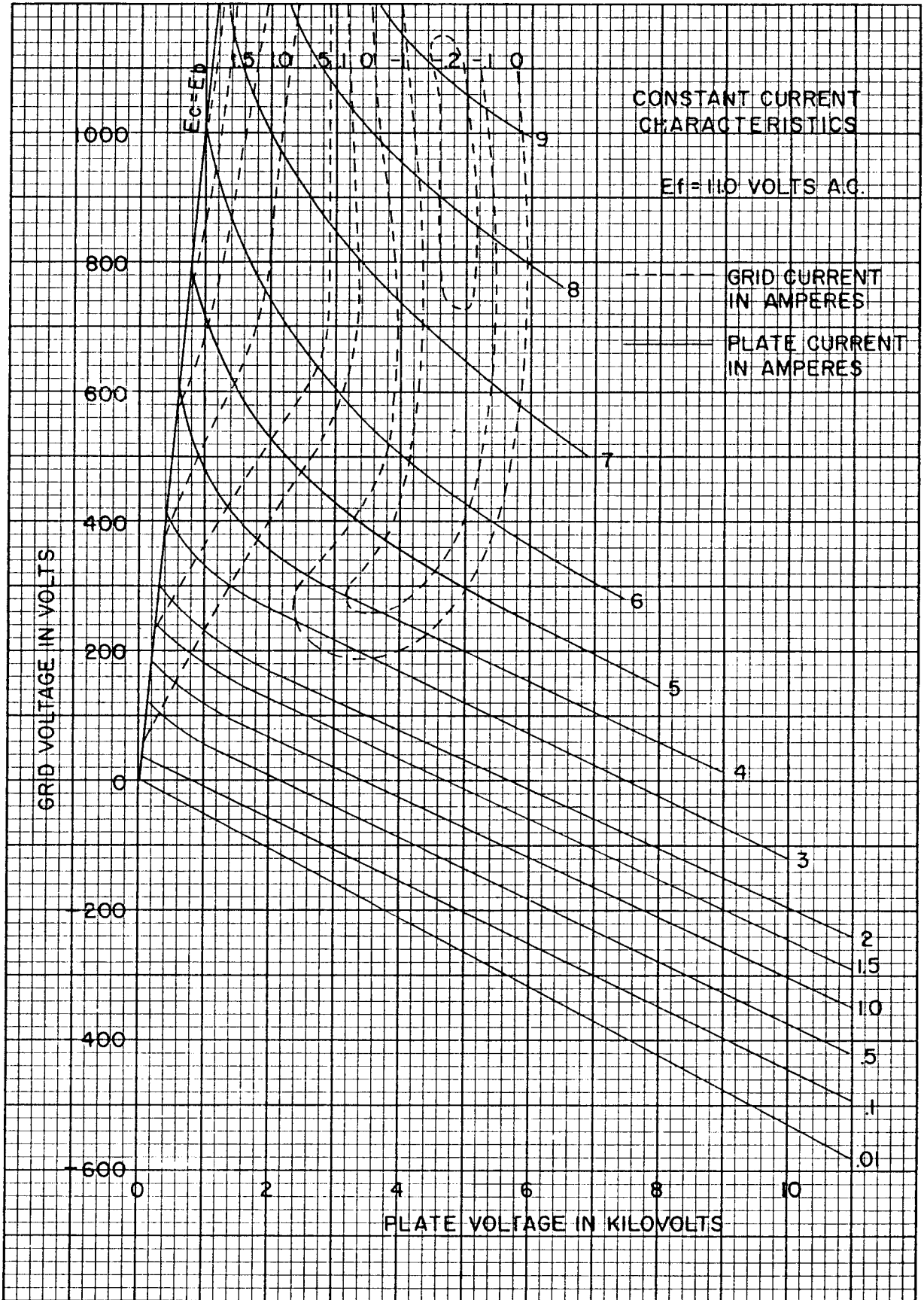
Maximum ratings apply at frequencies up to 22.5 Mc. These tubes can be operated at higher frequencies provided the maximum values of plate voltage and plate input are reduced in accordance with the table (other maximum ratings are the same as shown above). Special attention should be given to adequate ventilation of the bulb at the higher frequencies.

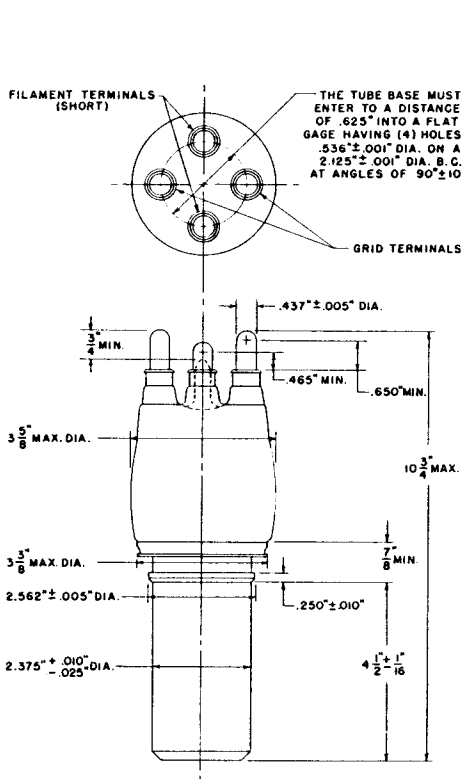
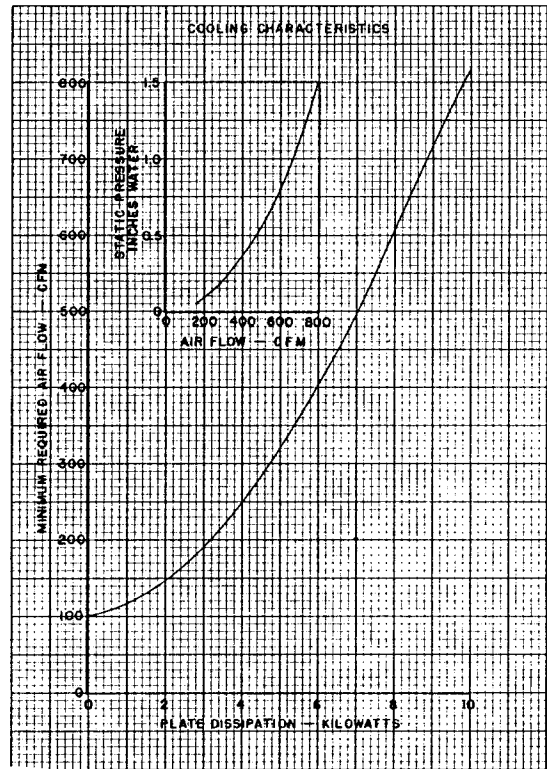
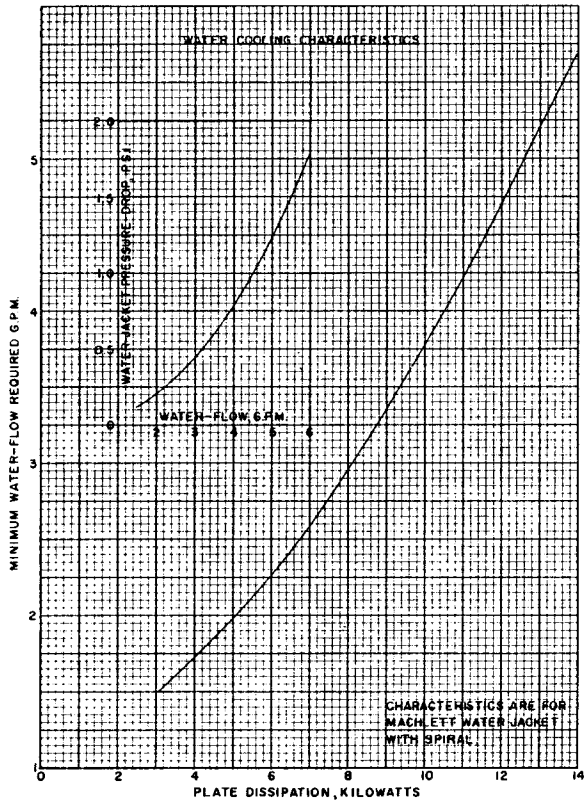
Frequency	22.5	35	50	Mc
Percentage of Maximum Rated Plate Voltage and Plate Input				
Class B	100	80	70	
Class C, Plate Modulated	100	75	50	
Class C, Unmodulated	100	75	50	

CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

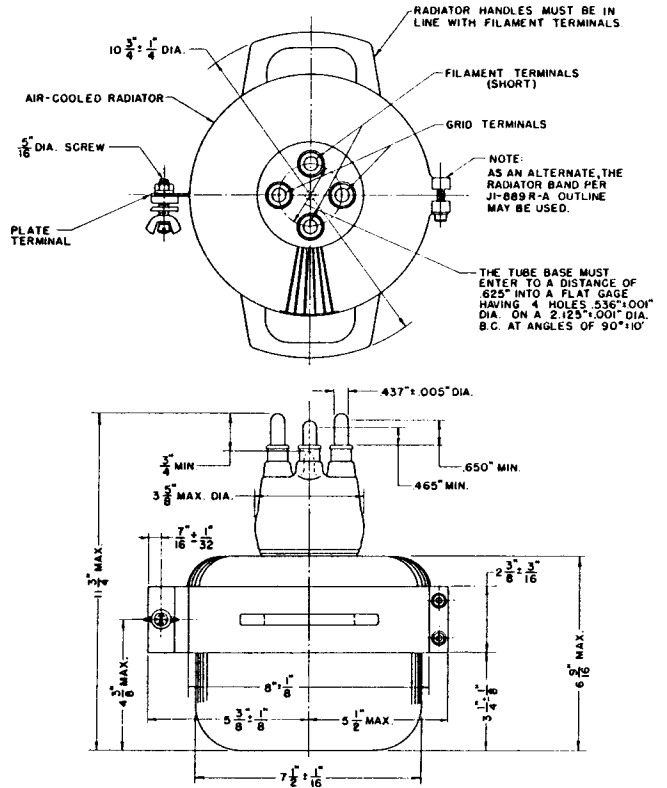
Characteristics	Conditions	Minimum	Limits Bogey	Maximum
Grid Voltage	$e_b = 2000$ volts; $i_b = 6$ amps	e_c :	—	800 volts
Grid Current	$e_b = 2000$ volts; $i_b = 6$ amps	i_c :	—	1.5 amps
Plate Voltage	$E_c = 0$ Vdc; $I_b = 1.0$ Adc	E_b :	2.8	3.3 kVdc
Plate Voltage	$E_c = -200$ Vdc; $I_b = 1.0$ Adc	E_b :	6.5	7.5 kVdc
Grid Voltage	$E_b = 7.5$ kVdc; $I_b = 0.020$ Adc	E_c :	-325	-370 Vdc
Peak Cathode Current	(See Note)	i_k :	7.5	amps
Power Output	$E_b = 10$ kVdc; $I_b = 2.0$ Adc	P_o :	12	kW
	$E_c = -1200$ Vdc; $I_c = 0.30$ Adc			
	$F = 22.5$ Mc			

Note: Represents maximum useable plate current plus grid current for any condition of operation.





DIMENSIONS — ML-5666



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THE MACHLETT LABORATORIES, INC.

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SPRINGDALE



CONNECTICUT

U. S. A.