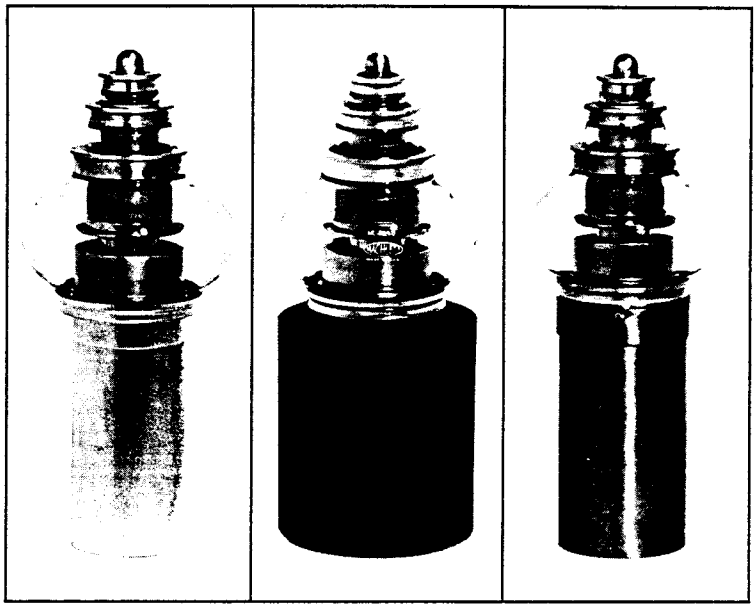


ISSUED 5-64

ML-8038
ML-8040
ML-8041

High-Mu Triodes

Pulse Power

to 20 Mw

MACHLETT

ELECTRON TUBE SPECIALIST

DESCRIPTION

The ML-8038, ML-8040 and ML-8041 are high-mu triodes designed primarily to operate as switch tubes in hard-tube pulse modulators, for radar and similar applications. In this service the ML-8038 can deliver pulse power output in the order of 10 to 20 megawatts. The ML-8040 and ML-8041 are capable of delivering 5 to 10 Mw.

The cathode of each type is a sturdy, self-supporting, stress-free thoriated-tungsten filament. The ML-8038 is designed for operation in oil or equivalent dielectric liquid, which is required for utilization of the maximum plate voltage rating of 125kV. Its anode is capable of dissipating 5 kilowatts when cooled by free convection of oil. The anode of the ML-8040 is forced-air-cooled, and is designed to dissipate 10kW with an air flow of approximately 800 cfm. The anode of the ML-8041 is water cooled and is capable of dissipating 60kW with a water flow of approximately 22 gpm.

GENERAL CHARACTERISTICS

Electrical	
Filament Voltage	13.0 Volts
Filament Current	205 Amps
Filament Starting Current, maximum	800 Amps
Filament Cold Resistance	0.0073 Ohms
Amplification Factor	120
Interelectrode Capacitance:	
Grid-Plate	30 $\mu\mu$f
Grid-Filament	80 $\mu\mu$f
Plate-Filament	0.8 $\mu\mu$f
Mechanical	
Mounting Position	Vertical, Anode down
Type of Cooling — ML-8038	Oil convection
Maximum bulk oil temperature	75° C*
Type of Cooling — ML-8040	Forced-air
Air flow on anode for 10kW dissipation, min.	800 cfm at 2.5" water
Air flow on bulb and filament seals	50 — 150 cfm†
Maximum incoming air temperature	50° C
Type of Cooling — ML-8041	Water and Forced-air
Water flow on anode for 60kW dissipation, min.	22 gpm
Air flow on bulb and filament seals	50 — 150 cfm†
Maximum outgoing water temperature	70° C
Maximum Glass Temperature	165° C

Net Weight, Approximate, ML-8038, 20 lb; ML-8040, 60 lb; ML-8041, 22 lb.

*It may be necessary to promote mixing of oil by agitation.

†Sufficient air cooling must be provided to keep glass seal temperatures at less than 165°C under all conditions of operation.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

VALUES APPLY TO ALL THREE TYPES UNLESS OTHERWISE SPECIFIED

Pulse Modulator or Pulse Amplifier

Maximum Ratings, Absolute Values	ML-8038	ML-8040	ML-8041	
D-C Plate Voltage	*125	▲60	▲60	kV
Peak Plate Voltage	*125	65	65	kv
D-C Grid Voltage	—1500	—1500	—1500	volts
Pulse Cathode Current	175	175	175	amp
Grid Dissipation	1000	1000	1000	watts
Plate Dissipation	5	10	60	kW
Pulse Duration‡	1000	1000	1000	μsec
Duty Factor‡	0.01	0.01	0.01	

*For very high reliability in circuits containing considerable stored energy, it is recommended that the plate voltage not exceed 100 kV.

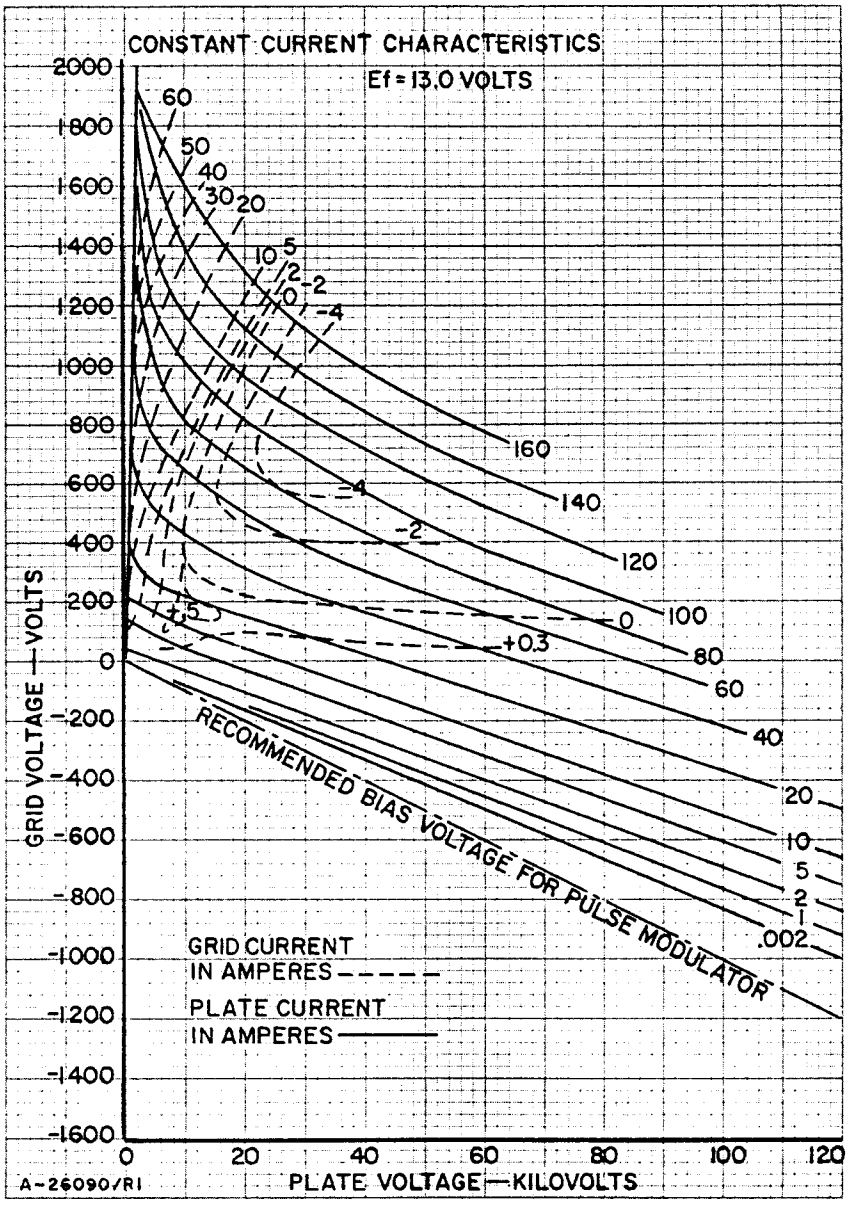
▲D-C Plate and Peak Plate voltages listed apply for operation in air. Higher voltages are possible by immersing tube in oil or other suitable dielectric fluids. For details, consult Machlett.

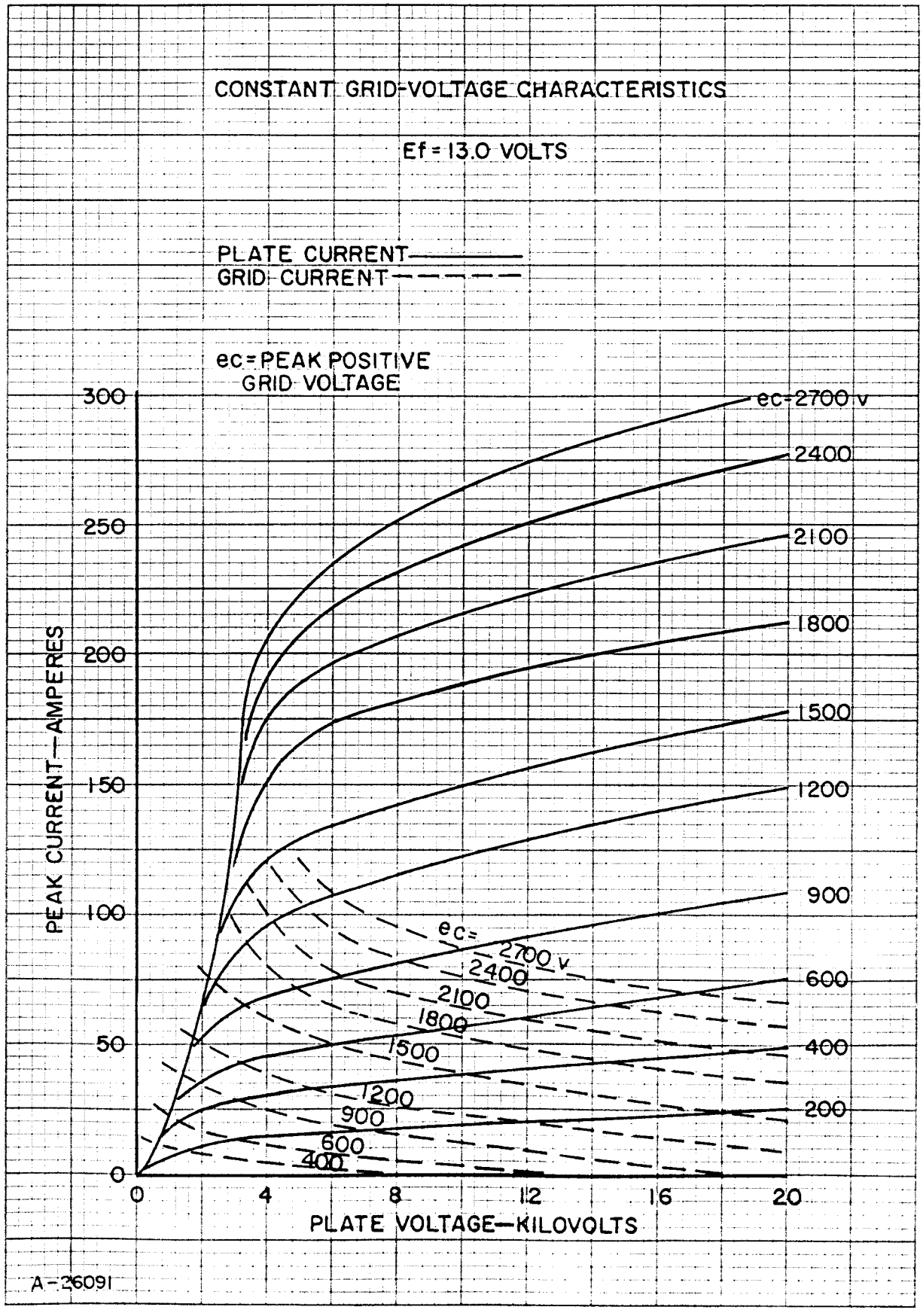
Typical Operation	ML-8038			
D-C Plate Voltage	60	100	125	kV
D-C Grid Voltage	—600	—1000	—1300	volts
Pulse Positive Grid Voltage	1350	1350	1700	volts
Pulse Plate Current	115	135	†175	amp
Pulse Grid Current	45	30	45	amp
Pulse Driving Power	9	70	135	kw
Pulse Power Output	6.3	12	20	Mw
Plate Output Voltage	55	90	115	kv
Duty Factor	.008	.003	.002	

‡For applications requiring longer pulse duration or higher duty factors, consult the Machlett Engineering Department.

†At filament voltage 5-10 percent above normal.

WARNING: Operation of this tube may produce x-rays. Adequate rayproof shielding must therefore be provided in the equipment.




CONSTANT GRID-VOLTAGE CHARACTERISTICS
Ef = 13.0 VOLTS
PLATE CURRENT
GRID CURRENT
ec = PEAK POSITIVE GRID VOLTAGE
PEAK CURRENT—AMPERES
PLATE VOLTAGE—KILOVOLTS
ec=2700 v
2400
2100
1800
1500
1200
900
600
400
200
ec=
2700 v
2400
2100
1800
1500
1200
900
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12
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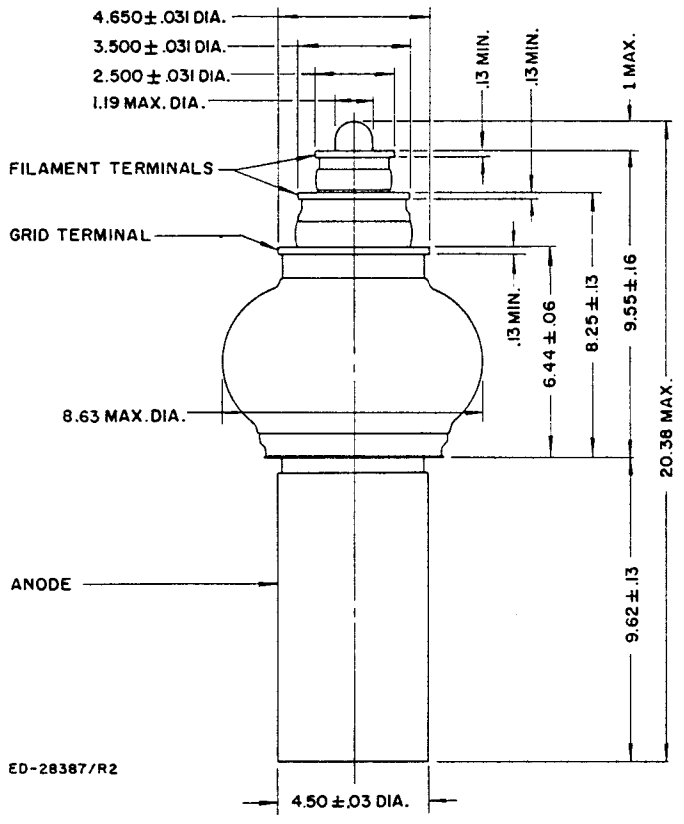
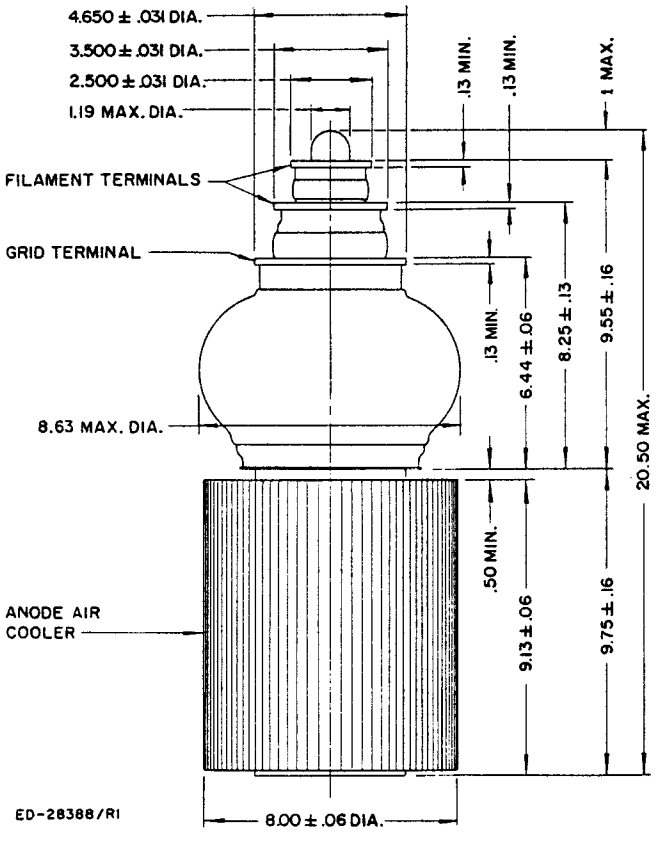


ALL DIMENSIONS IN INCHES

DIMENSIONS — ML-8038



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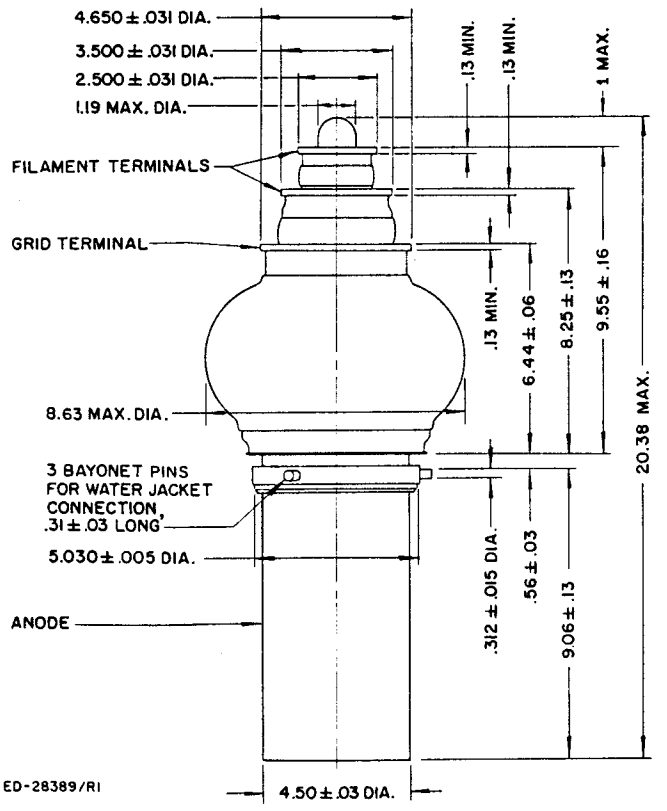
DIMENSIONS — ML-8040



ALL DIMENSIONS IN INCHES

DIMENSIONS — ML-8041

THE MACHLETT LABORATORIES, INC.

An Affiliate of Raytheon Company

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