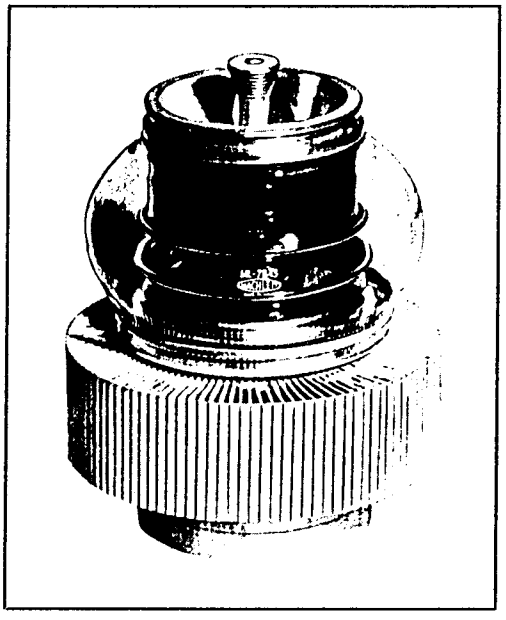
ISSUED 5-64



ML-7845

Shielded Grid Triodes

Pulse Power
to 4.5 Mw

MACHLETT
ELECTRON TUBE SPECIALIST

DESCRIPTION

The ML-7845 is a shielded-grid triode designed primarily to operate as a switch tube in hard-tube pulse modulators, for radar and similar applications. In this service it can deliver more than four megawatts pulse power output.

The ML-7845 has sturdy electrodes arranged to form a cylindrical array of electron-optical systems, featuring a shield electrode connected internally to the cathode by direct, low-impedance paths. This design permits operation with low grid current, and it results in favorably low grid-plate capacitance. The presence of the ground-potential shield adjacent to the anode, furthermore, protects the cathode and grid from damage by transient arcs.

The cathode is unipotential, oxide-coated. The anode is cooled by forced-air or dielectric gas. When cooled by forced air the anode is capable of dissipating 3 kW with 150 cfm air flow. The maximum ratings of 75 kVdc and 80 kv peak apply when the tube is completely immersed in a suitable dielectric gas such as sulfur hexafluoride.

Note: Data contained herein are based on initial design and test criteria. Before using these data in final equipment designs, consult Machlett for possible revisions.

GENERAL CHARACTERISTICS

Electrical		
Heater Voltage	6.0±5%	Volts
Heater Current	60	Amps
Heater Starting Current, maximum	300	Amps
Cathode Warm-up Time	10	Minutes*
Amplification Factor	500	
Interelectrode Capacitances:		
Grid-Plate	1.4	$\mu\mu f$
Grid-Cathode	250	$\mu\mu f$
Plate Cathode	18	$\mu\mu f$
Mechanical		
Mounting Position (support tube by anode radiator only)	Any	
Type of Cooling	Forced-air†	
Air flow on anode, minimum for 3kW dissipation	150 cfm at 0.2" water	
Air flow on grid	50	cfm
Maximum incoming air temperature	65	°C
Maximum Glass Temperature	175	°C†
Net Weight, approximate	40	lbs.

*For accelerated cathode warm-up, the filament may be energized at 7.0 volts for 5 minutes and then reduced to 6.0 volts for high-voltage operation. If a filament stand-by voltage of 5.0 volts is used, the minimum cathode warm-up time is 1 minute at 6.0 volts.

†Sufficient air flow must be provided to maintain glass temperatures at less than 175°C under all conditions of operation.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

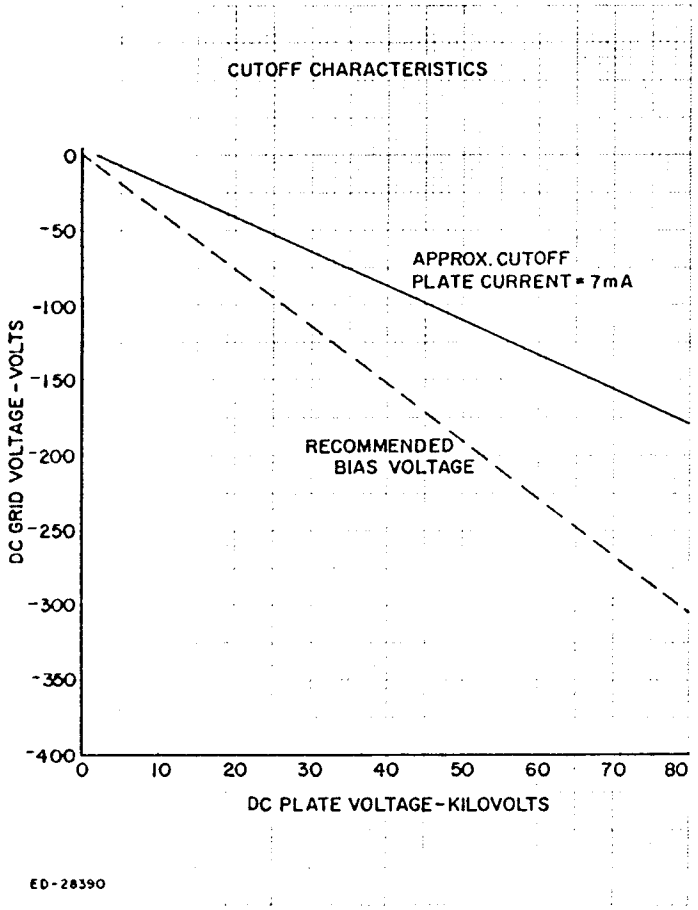
Pulse Modulator or Pulse Amplifier

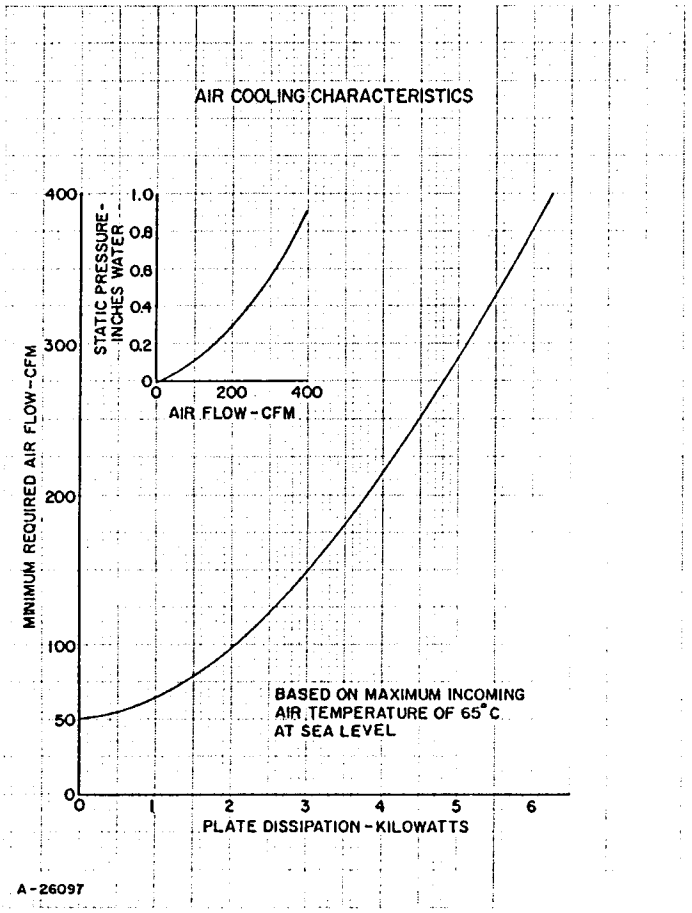
Maximum Ratings, Absolute Values			
D-C Plate Voltage		75	kV*
Peak Plate Voltage		80	kv*
D-C Grid Voltage		−600	volts
Peak Positive Grid Voltage		1500	volts
Peak Negative Grid Voltage		−1500	volts
Pulse Cathode Current		90	amp
D-C Plate Current		250	mA
Grid Dissipation		75	watts
Plate Dissipation		3.0	kW
Pulse Duration†		25	μsec
Duty Factor†		.03	
Typical Operation			
D-C Plate Voltage	75	75	kV*
D-C Grid Voltage	−300	−300	volts
Pulse Positive Grid Voltage	500	1300	volts
Pulse Plate Current	20	75	amp
Pulse Grid Current	1	10	amp
Pulse Driving Power	0.8	16	kw
Pulse Power Output	1.3	4.5	Mw
Plate Output Voltage	65	60	kv

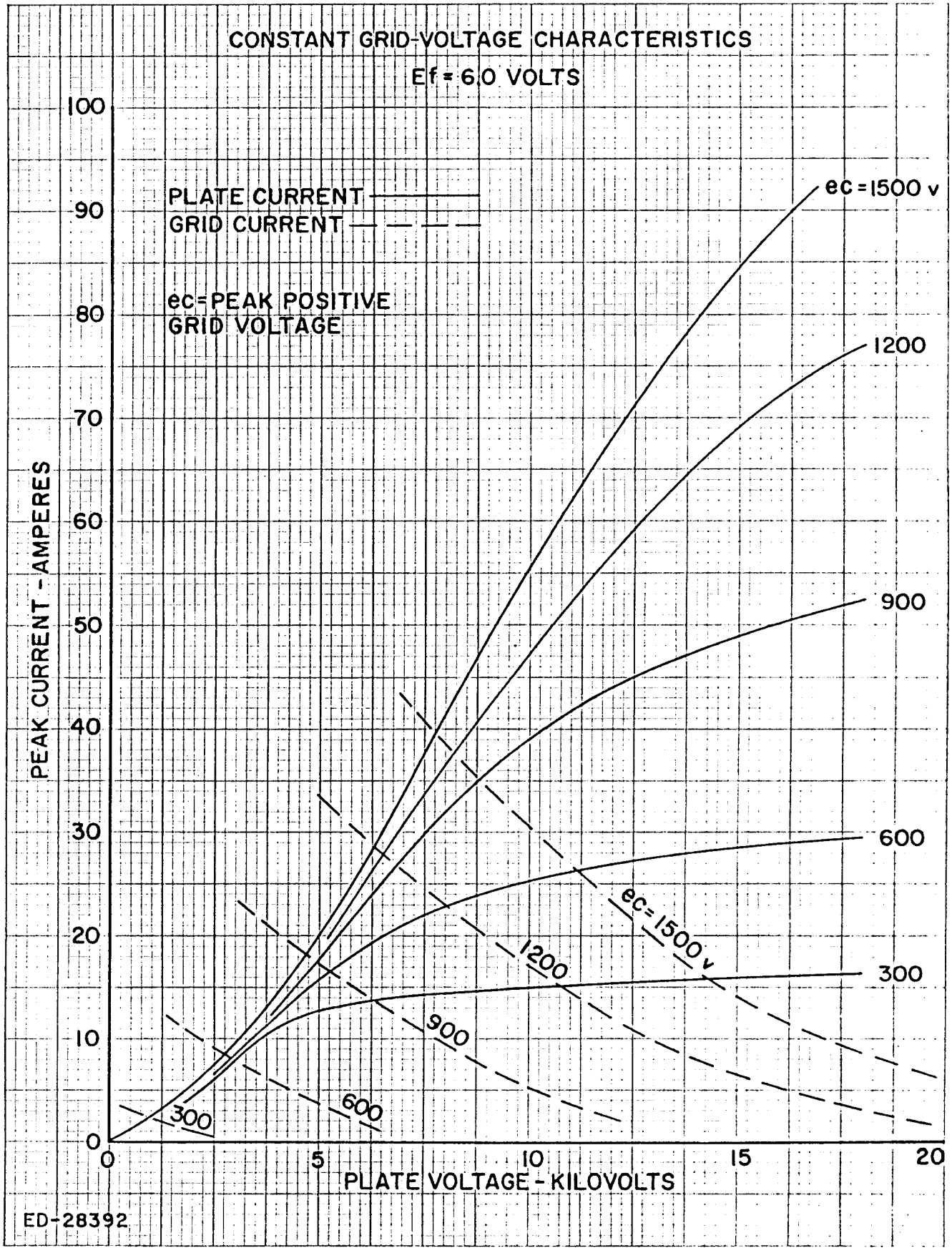
*This voltage may be applied only when the tube is in a suitable dielectric fluid.

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

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






CONSTANT GRID-VOLTAGE CHARACTERISTICS
Ef = 6.0 VOLTS
PLATE CURRENT
GRID CURRENT
ec=PEAK POSITIVE
GRID VOLTAGE
ec=1500 v
1200
900
600
300
ec=1500 v
1200
900
600
300
PEAK CURRENT - AMPERES
PLATE VOLTAGE - KILOVOLTS
0
10
20
30
40
50
60
70
80
90
100
0
5
10
15
20
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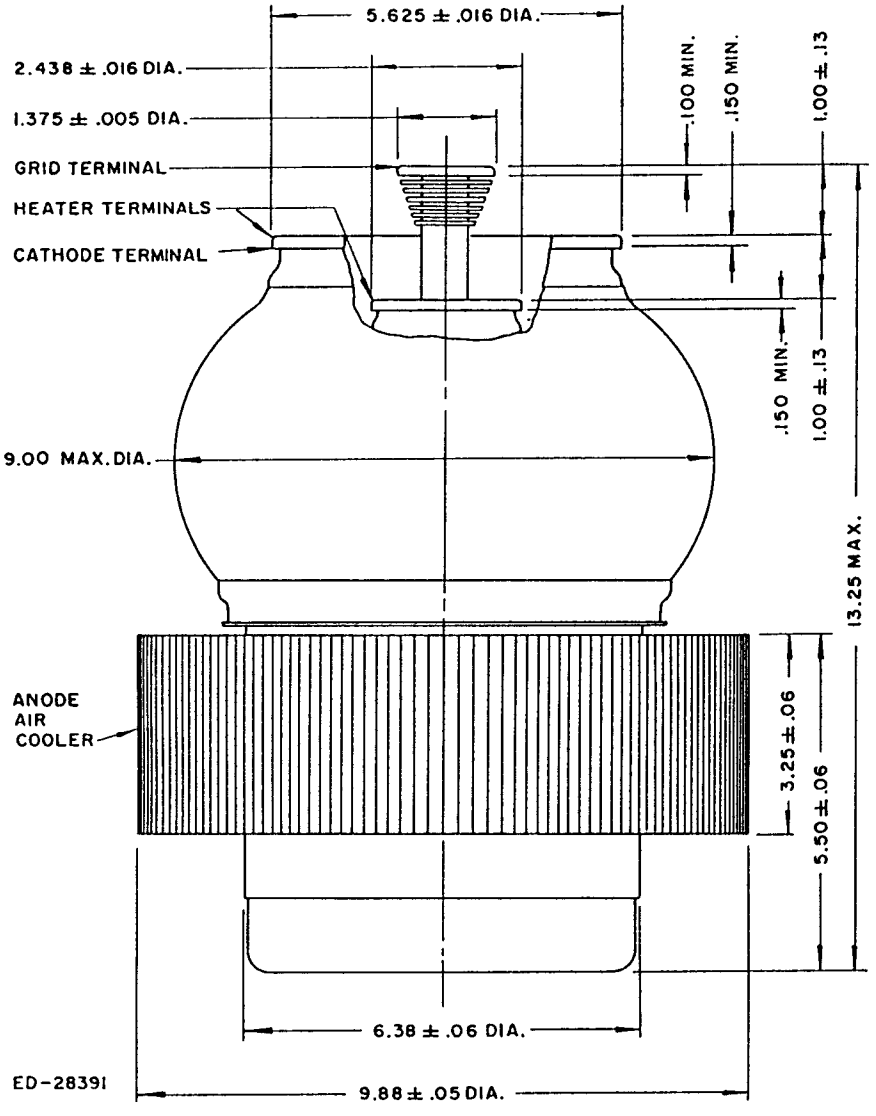

DIMENSIONS — ML-7845

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