



EITEL-McCULLOUGH, INC.
SAN CARLOS, CALIFORNIA

TENTATIVE DATA

4KM50,000LF

**POWER-AMPLIFIER
L-BAND KLYSTRON**

The Eimac 4KM50,000LF is a four-cavity, magnetically focused, power-amplifier klystron designed for use at frequencies from 610 to 790 megacycles. Although intended primarily for UHF television visual service this klystron may also be used for FM, for aural TV, or for tropospheric-scatter communications service.

When tuned for narrow band CW operation this klystron will deliver a minimum output power of 10 kilowatts with a power gain of 45 db. In television visual service it will provide more than 10 kilowatts of peak synchronizing output power with a power gain of 30 db. The AM random noise is more than 50 db below black level. Minimum bandwidth at the 3 db power level is 8 megacycles with a minimum of 7 megacycles at the 1 db level.

The 4KM50,000LF employs the Eimac Modulating Anode which provides an effective means of protecting the tube from internal arcs.

All tuning is accomplished outside of the vacuum envelope by means of external resonant cavities which enclose the cylindrical ceramic windows of the klystron. This design permits a wide tuning range and allows external cavity loading for broadband applications. For spares or replacements, only the basic vacuum tube, without cavities, need be purchased.

Eimac Klystron Amplifier Circuit Assembly H-139 has been designed for use with the 4KM50,000LF to cover the specified frequency range. This assembly includes a klystron supporting structure, magnetic focusing coils, tuning cavities, adjustable load couplers for the second, third and output cavities and an Eimac SK-110 Air System Socket.

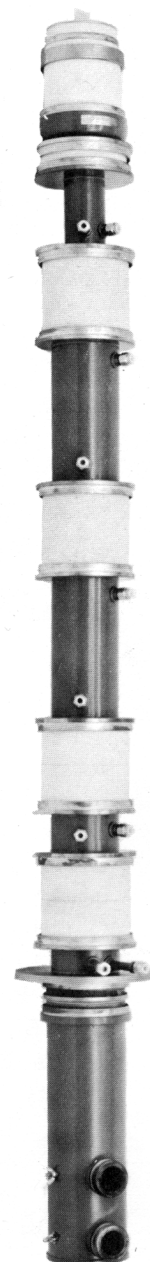
CHARACTERISTICS

ELECTRICAL

Heater:	Voltage	-	-	-	-	7.5	volts
	Current	-	-	-	-	40.0	amperes
	Maximum Starting Current	-	-	-	-	80.0	amperes
Cathode:	EMA, Unipotential						
	Heating Time	-	-	-	-	5	minutes
Getter (Operating):							
	Voltage	-	-	-	-	2.0	volts
	Current	-	-	-	-	36.0	amperes
Power Gain:	Narrow Band	-	-	-	-	45	decibels
	Television Visual Service	-	-	-	-	30	decibels
Output Power:	Television Visual Service	-	-	-	-	10	kilowatts
Frequency Range (H-139 Assembly)						610 to 790 megacycles	

MECHANICAL

Operating Position	-	-	-	-	-	Axis vertical, cathode up
R-F Coupling:						
Input	-	-	-	-	-	Type "N" coaxial fitting
Output	-	-	-	-	-	3 1/8 inch, 50-ohm line
Input Cavity Loading	-	-	-	-	-	Type "N" coaxial fitting
2nd and 3rd Cavity Loading	-	-	-	-	-	1 5/8 inch, 50-ohm line





MECHANICAL (cont'd)

Shipping Weights:

4KM50,000LF Klystron only	-	-	-	-	-	64	pounds
H-139 RF Circuit Assembly	-	-	-	-	-	767	pounds

Cooling: Water and Forced Air

						<u>Flow Rate</u>	<u>Pressure Drop</u>
Cathode (with SK-110 Air System Socket)	-	-	-	-	-	*25 cfm	1 inch H ₂ O
Output Cavity	-	-	-	-	-	*50 cfm	1.5 inches H ₂ O
Klystron Body (5 drift-tube sections, in series)	-	-	-	-	-	1 gpm	28 psi
Klystron Collector	-	-	-	-	-	(See collector cooling curves)	

MAGNETIC-COIL POWER-SUPPLY REQUIREMENTS

Prefocus Coil: Voltage	-	-	-	-	-	0 to 50	volts
Current	-	-	-	-	-	0 to 1.5	amperes
Three Body Coils and Collector Coil in Series:							
Voltage	-	-	-	-	-	0 to 500	volts
Current	-	-	-	-	-	0 to 2.5	amperes

MAXIMUM RATINGS

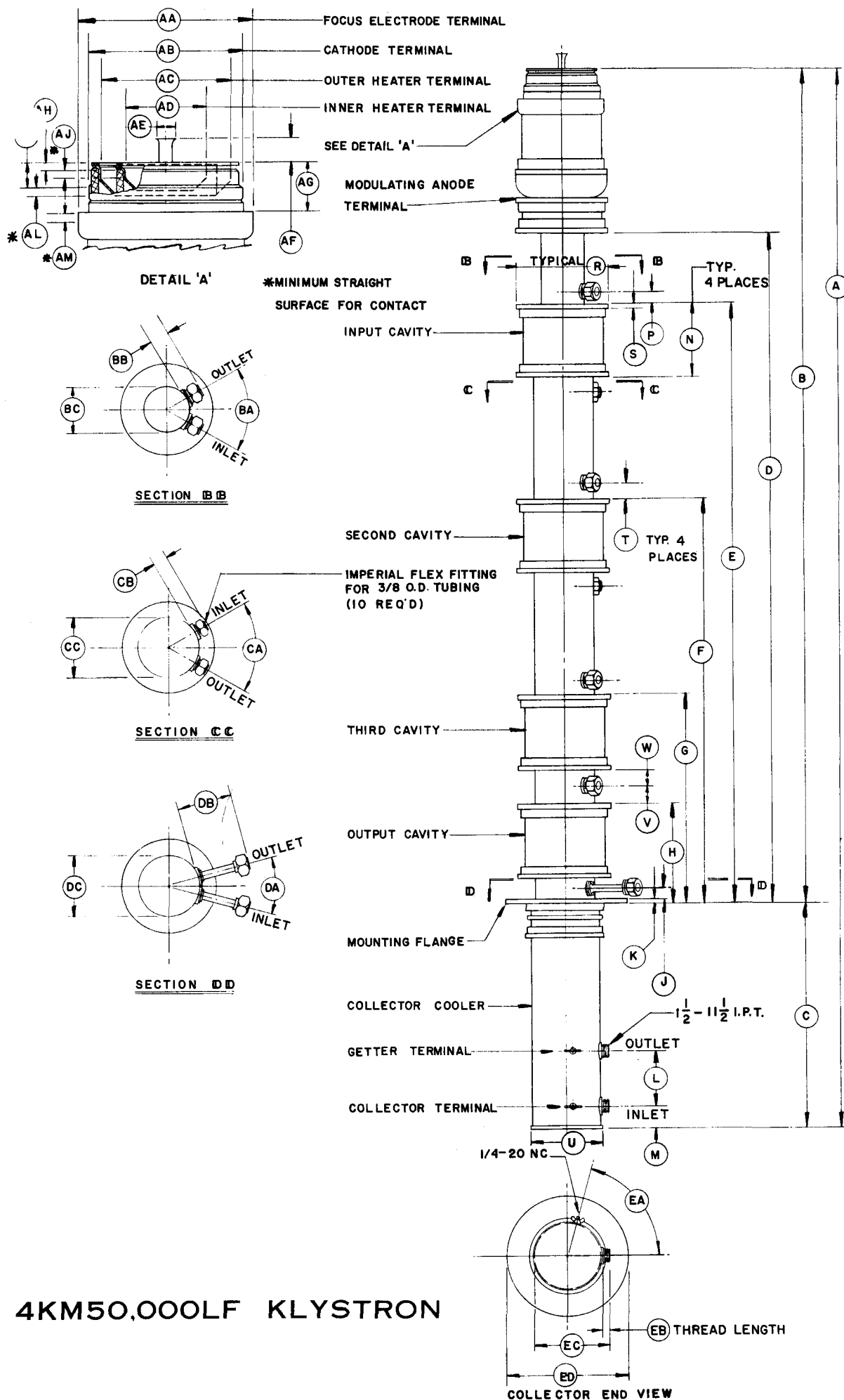
D-C BEAM VOLTAGE	-	-	-	-	-	20	KILOVOLTS
D-C BEAM CURRENT	-	-	-	-	-	2.5	AMPERES
D-C BODY CURRENT	-	-	-	-	-	150	MILLIAMPERES
A-C GETTER CURRENT	-	-	-	-	-	50	AMPERES
FOCUS-ELECTRODE VOLTAGE	-	-	-	-	-	-500	VOLTS
COLLECTOR DISSIPATION	-	-	-	-	-	60	KILOWATTS
INLET WATER PRESSURE	-	-	-	-	-	50	PSI

TYPICAL OPERATION

		<u>TV Visual Service</u>	<u>Narrow Band</u>	
Frequency	-	610	735	megacycles
Output Power	-	12.6	15.6	kilowatts
Driving Power	-	10	0.30	watts
Power Gain	-	30.3	47.2	decibels
D-C Beam Voltage	-	18	18	kilovolts
D-C Beam Current	-	2.03	2.03	amperes
Beam Power Efficiency	-	34.5	43	percent
D-C Body Current	-	75	45	milliamperes
Focus-Electrode Voltage	-	-200	-200	volts
Cavity Loading:				
1st Cavity	-	0.47	--	watts
2nd Cavity	-	116	--	watts
3rd Cavity	-	390	--	watts
Magnetic-Coil Currents:				
Prefocus Coil	-	1.15	1.15	amperes
Three Body Coils and Collector Coil in Series		2.3	2.3	amperes

* At sea level with 20° C inlet air temperature.

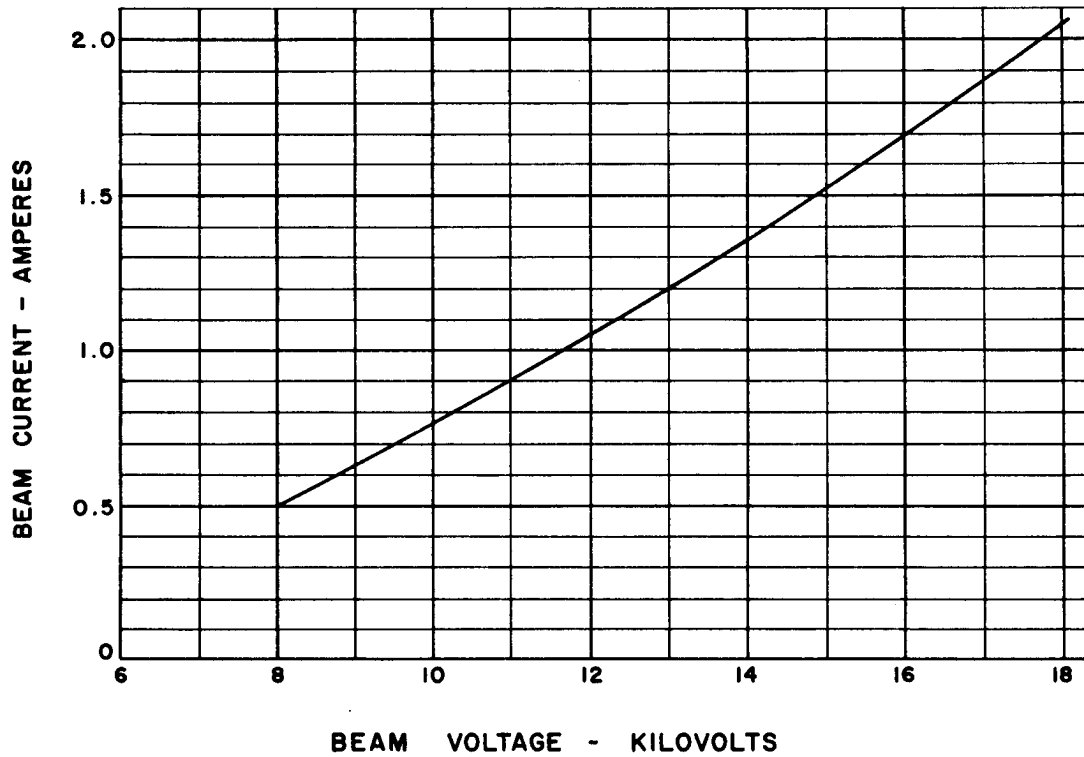
For additional information or information regarding a specific application, write to
Eitel-McCullough, Inc., San Carlos, California.



DIMENSION DATA			
ITEM	NOM.	MIN.	MAX.
A		63.700	65.200
B		49.600	50.300
C		14.250	14.750
D		41.600	42.100
E		37.800	38.325
F		25.600	26.000
G		13.400	13.700
H		6.490	6.650
J		0.400	0.500
K		0.335	0.365
L		3.200	3.300
M		1.100	1.300
N		4.950	5.040
P		0.840	1.100
R		5.105	5.145
S		0.230	0.270
T		0.840	
U		4.16 5	4.215
V		0.840	
W		0.840	
AA		4.300 DIA.	4.450 DIA.
AB		3.750 "	3.835 "
AC		3.100 "	3.200 "
AD		1.865 "	1.950 "
AE			1.188
AF			1.750
AG		1.000	1.500
AH		.125	.175
AJ		.100	
AK		.670	.775
AL		.100	
AM		.500	
BA		55°	65°
BB		0.800	1.000
BC		2.100	2.140
CA		55°	65°
CB		0.800	1.000
CC		3.480	3.520
DA		25°	35°
DB		2.430	2.630
DC		3.480	3.520
EA		75°	85°
EB		0.600	
EC		4.875	5.125
ED		7.140	7.165

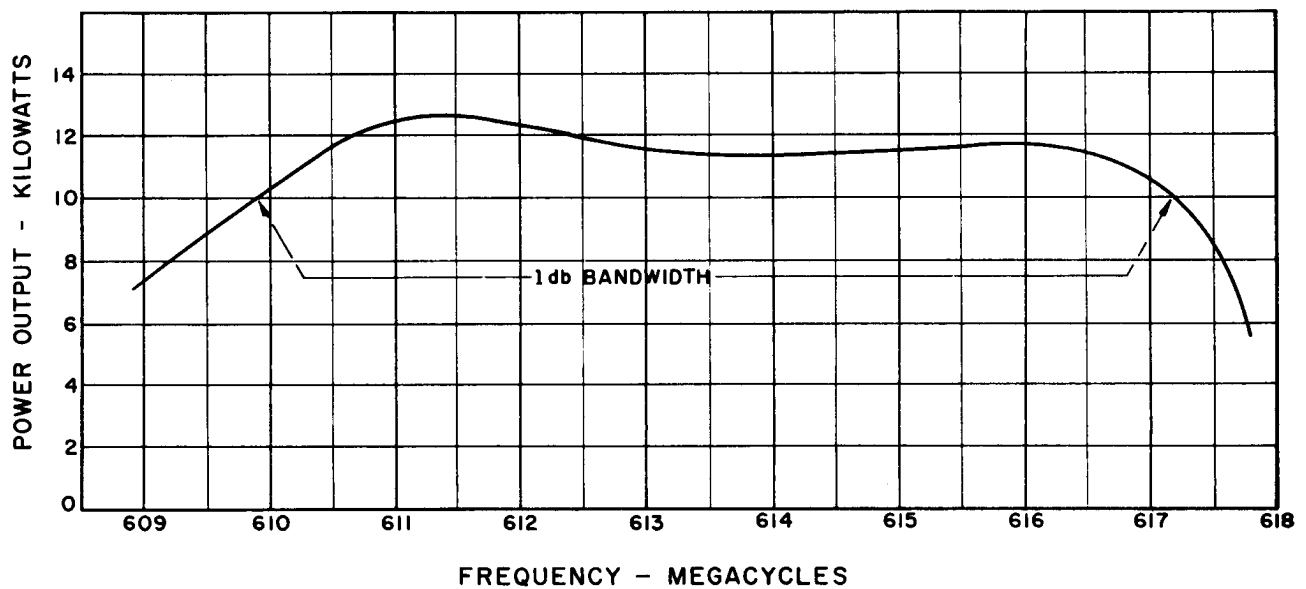
4KM50,000LF KLYSTRON

EIMAC 4KM50,000LF
 BEAM VOLTAGE vs BEAM CURRENT
 $E_{foc} = -200$ VOLTS



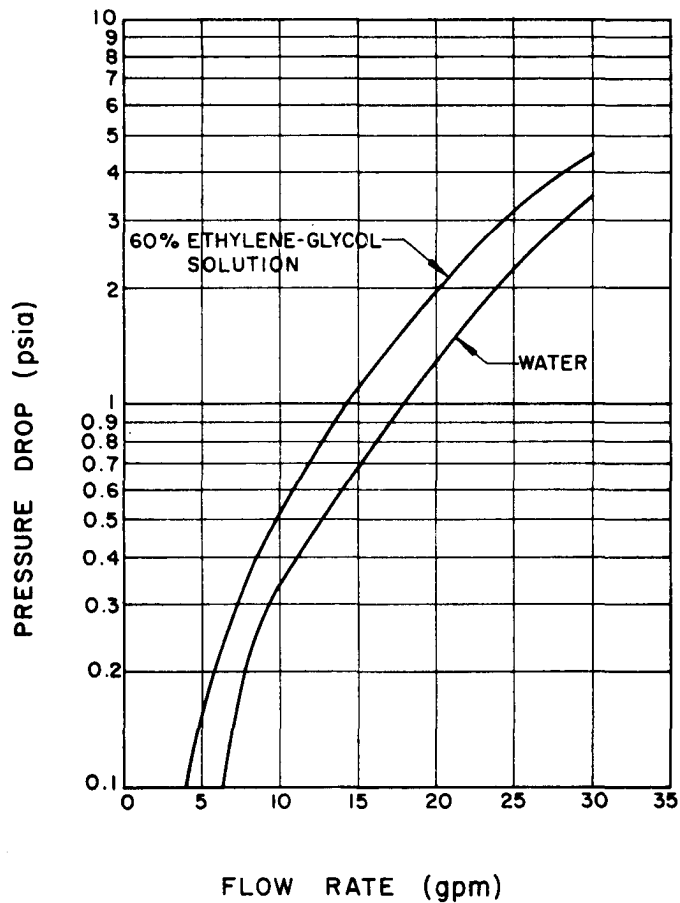
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BANDWIDTH DATA
 $E_b = 18$ KILOVOLTS
 $I_b = 2.03$ AMPERES
 $P_D = 10$ WATTS



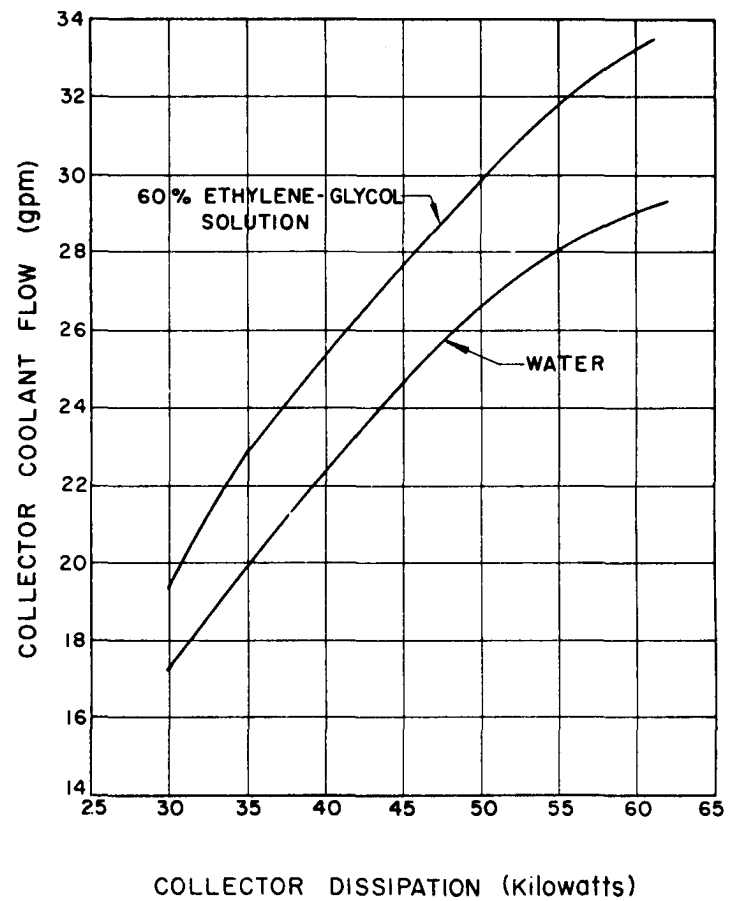
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PRESSURE DROP vs COOLANT FLOW RATE
ACROSS COLLECTOR



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COLLECTOR DISSIPATION vs COOLANT FLOW
COOLANT INLET TEMPERATURE 25°C



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POWER OUTPUT vs FREQUENCY

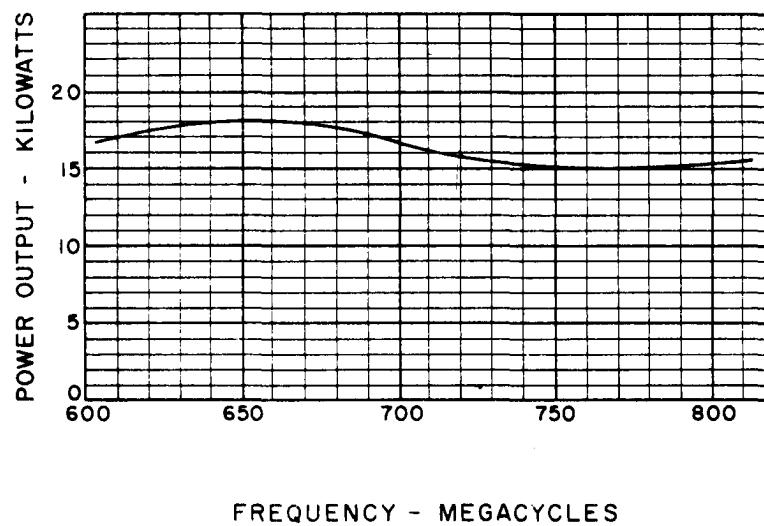
NARROW BAND

$I_b = 2.03$ AMPERES

$P_d = 0.3$ WATTS

$E_{foc} = -200$ VOLTS

$E_b = 18$ KILOVOLTS

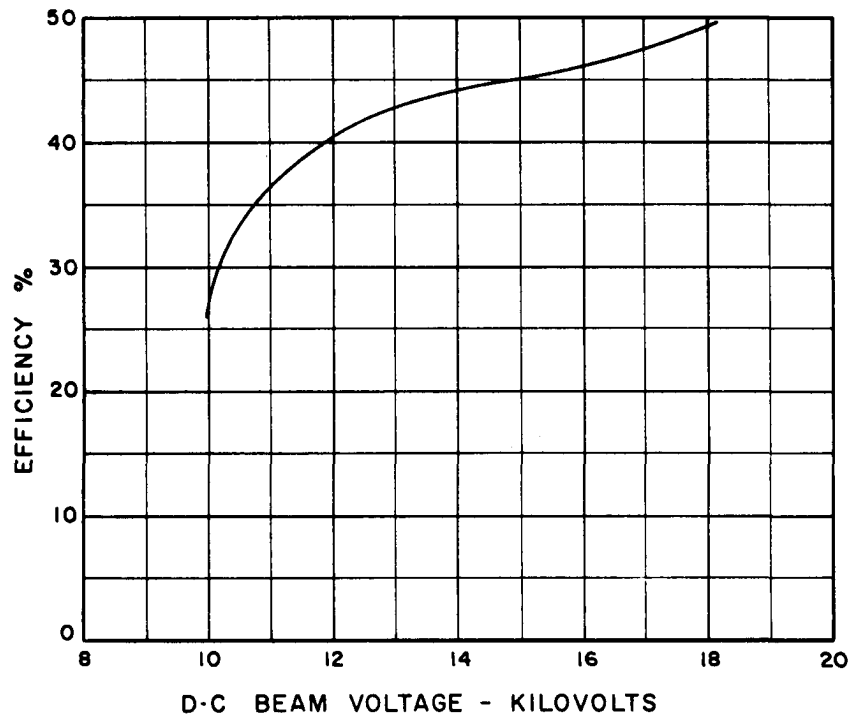


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EFFICIENCY vs BEAM VOLTAGE

NARROW BAND

FREQUENCY = 700 MEGACYCLES



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POWER OUTPUT vs BEAM VOLTAGE

NARROW BAND

FREQUENCY = 700 MEGACYCLES

