



EITEL-McCULLOUGH, INC.
SAN CARLOS, CALIFORNIA

TENTATIVE DATA
3CV30,000A3
MEDIUM-MU
VAPOR-COOLED
POWER TRIODE

The Eimac 3CV30,000A3 is a vapor-cooled, ceramic-metal power triode designed primarily for use in industrial radio-frequency heating service. Its vapor-cooled anode is conservatively rated at 30 kilowatts of plate dissipation when mounted in an Eimac BR-200 boiler.

Full input of 60 kilowatts is permissible up to 100 megacycles. Large reserve emission is available from its one kilowatt filament and the grid structure is rated at one ampere making this tube an excellent choice for severe applications.

It is also recommended as a grounded grid FM amplifier, a conventional plate-modulated amplifier or as a linear amplifier in new equipment designs.



GENERAL CHARACTERISTICS

ELECTRICAL	Min.	Nom.	Max	
Filament: Thoriated-Tungsten				
Voltage		6.3		volts
Current	152		172	amperes
Amplification Factor		20		
Interelectrode Capacitances, Grounded Cathode:				
Grid-Filament	48		58	$\mu\mu f$
Plate-Filament	1.2		1.5	$\mu\mu f$
Grid-Plate	30		38	$\mu\mu f$
Frequency for Maximum Ratings				100 Mc

MECHANICAL

Base	Coaxial
Recommended Socket	Eimac SK-1310
Recommended Boiler	Eimac BR-200
Operating Position	Vertical, base up
Cooling	Vapor & Forced air
Maximum Operating Temperatures:	
Anode Flange	200°C
Ceramic-to-Metal Seals	250°C
Maximum Dimensions:	
Height	8.75 inches
Diameter	7.5 inches
Net Weight	18 pounds

RF INDUSTRIAL OSCILLATOR

Class-C (Filtered DC Power Supply)

MAXIMUM RATINGS

DC PLATE VOLTAGE	10,000 VOLTS
DC PLATE CURRENT	6.0 AMPS
DC GRID CURRENT	1.0 AMP
PLATE INPUT POWER	60 KW
PLATE DISSIPATION	30 KW

TYPICAL OPERATION

DC Plate Voltage	7000	10,000	volts
DC Plate Current	6.0	6.0	amps
DC Grid Voltage	-600	-800	volts
DC Grid Current66	.315	amps
Peak Positive Grid Voltage	440	360	volts
Driving Power	660	365	watts
Plate Input Power	42	60	kW
Plate Dissipation	12	18	kW
Plate Output Power	30	42	kW
Approximate Load Impedance	600	750	ohms



3CV30,000A3

**RADIO-FREQUENCY POWER AMPLIFIER
PLATE-MODULATED**

Class-C

MAXIMUM RATINGS

DC PLATE VOLTAGE	7000 MAX. VOLTS
DC PLATE CURRENT	5.0 MAX. AMPS
PLATE DISSIPATION	20 MAX. KW
GRID DISSIPATION	500 MAX. WATTS

TYPICAL OPERATION

DC Plate Voltage	5000	7000 volts
DC Grid Voltage	-600	-820 volts
DC Plate Current	5.0	5.0 amps
DC Grid Current	600	600 mA
Driving Power	600	750 watts
Plate Output Power	17.8	27.5 kW

**RADIO-FREQUENCY
LINEAR AMPLIFIER Class-AB₂**

MAXIMUM RATINGS

DC PLATE VOLTAGE	10000 MAX. VOLTS
DC PLATE CURRENT	6.0 MAX. AMPS
PLATE DISSIPATION	30 MAX. KW
GRID DISSIPATION	500 MAX. WATTS

*Adjust to give specified zero-signal dc plate current

TYPICAL OPERATION

DC Plate Voltage	7000	10000 volts
DC Grid Voltage*	-250	-400 volts
Zero-Sig Plate Current	2.0	2.0 amps
Max-Sig DC Plate Current	6.0	6.0 amps
Max-Sig DC Grid Current	375	333 mA
Peak RF Grid Voltage	530	700 volts
Driving Power	200	240 watts
Plate Output Power	26.4	41 kW

Note: "TYPICAL OPERATION" data are obtained by calculation from published characteristic curves. No allowance for circuit losses has been made.

APPLICATION

ELECTRICAL

Filament — The rated filament voltage for the 3CV30,000A3 is 6.3 volts. Filament voltage, as measured at the socket, must be maintained at 6.3 volts plus or minus five percent for maximum tube life and consistent performance.

Control Grid Operation — The grid current rating is one ampere dc. This value should not be exceeded for more than very short periods such as during tuning and over-current protection in the grid circuit should be provided. Ordinarily it will not be necessary to operate with more than 0.4 to 0.6 amperes grid current to obtain reasonable efficiency. In industrial heating service with varying loads, grid current should be monitored continuously with a dc current meter. The maximum grid dissipation rating is 500 watts.

Plate Operation — The maximum plate input power rating is 60 kilowatts at 10,000 volts and 6.0 amperes dc. This rating applies for Class C amplifier or oscillator service and for Class AB applications.

When used as a plate modulated rf amplifier, input is reduced to 7000 volts at 5.0 amperes dc. Maximum input may be exceeded for short periods during tuning without exceeding plate dissipation ratings.

Plate over-current protection should be provided to remove plate voltage quickly in the event of an overload or an arc-over at the load. In addition current limiting power supply resistors should be used. These precautions are especially important in industrial service with its wide variations in loading.

Spark gaps from plate to ground should be used to prevent transient voltages from flashing across the tube envelope during any fault conditions.

Special Application — If it is desired to operate this tube under conditions widely different from these given here, write to Power Grid Tube Marketing Department, Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, California, for information and recommendations.

MECHANICAL

Mounting — The 3CV30,000A3 must be mounted vertically, base up in an Eimac BR-200 boiler. It is very important that the boiler tube assembly be mounted vertically, the water be maintained at the suggested level, and that the flange of the tube makes a vapor-tight seal against the rubber "O" ring and boiler.

Sockets — The Eimac SK-1310 socket is available for use with the 3CV30,000A3. Filament and grid connection are made to this socket.

Cooling — Cooling is accomplished by immersion of the anode in a distilled water-filled BR-200 boiler. The energy dissipated at the anode causes the water to boil and be converted into steam. Steam is carried away by convection to the condenser where it is cooled and condenses into water. Condensate is then returned to the boiler.

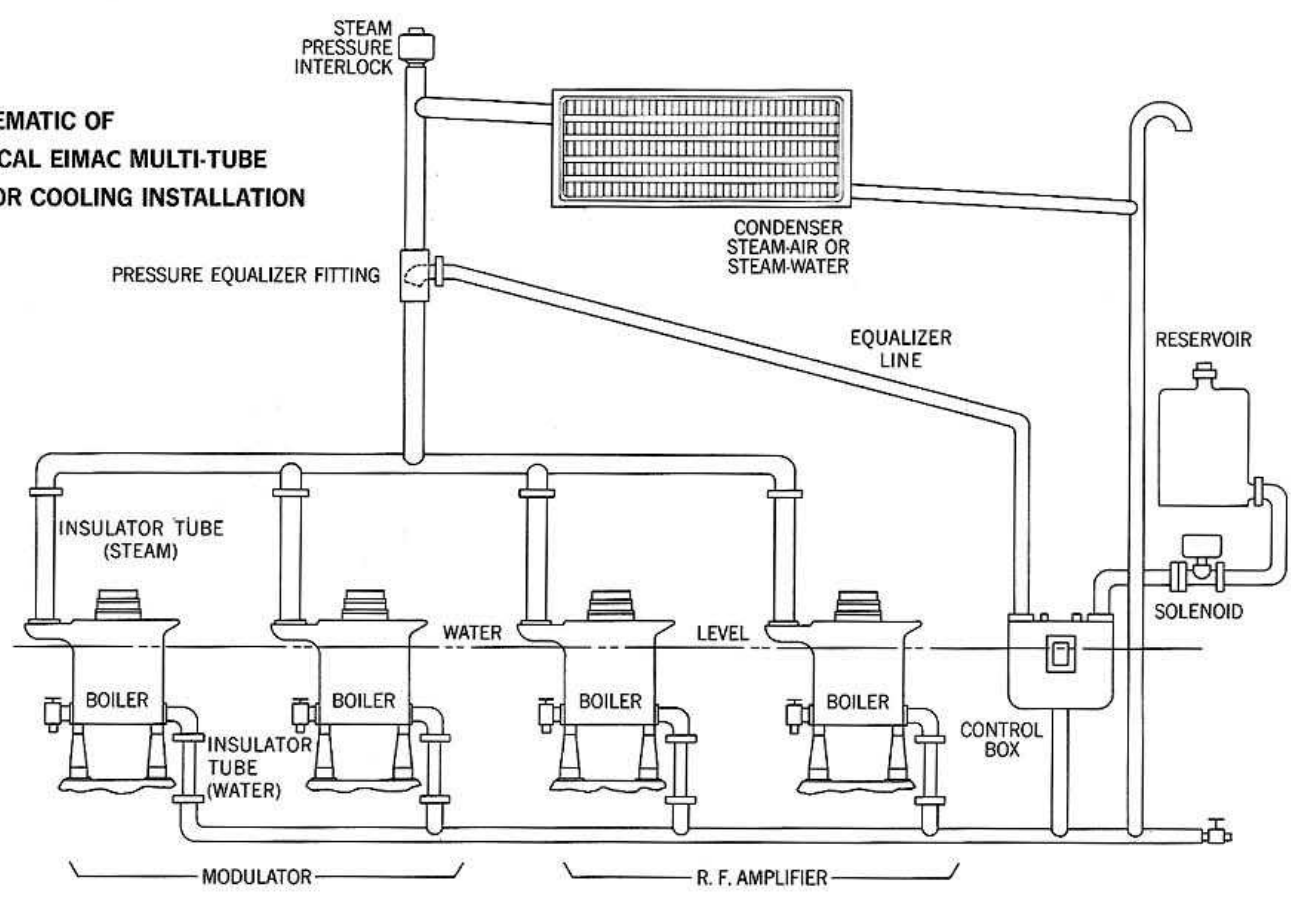
The boiling action maintains the anode surface temperature at approximately 100°C. In a properly designed system (such as the 3CV30,000A3 and BR-200) it is unlikely that anode surface temperature will ever exceed 125°C—well below the rated maximum for the tube—even at full plate dissipation levels.

The water in the boiler must be maintained at a constant level, just below the top of the anode fins. This level is marked on the boiler. A recommended system for assuring constant water level is shown in the system diagram below. This system incorporates an Eimac CB-202 Control Box to sense water level and a small reservoir to supply make-up water on demand. In the event of a drop in system water level, a switch is closed in the control box, energizing a solenoid water valve in the line from the reservoir. When the make-up water brings the system back to the proper level, the switch is opened, de-energizing the solenoid valve. A second switch in the CB-202 Control Box senses a lower, danger level and can be used to actuate an alarm or shut down the system.

For reliable operation, it is essential that the Control Box be mounted so that the level sensed is the actual level in the boiler.

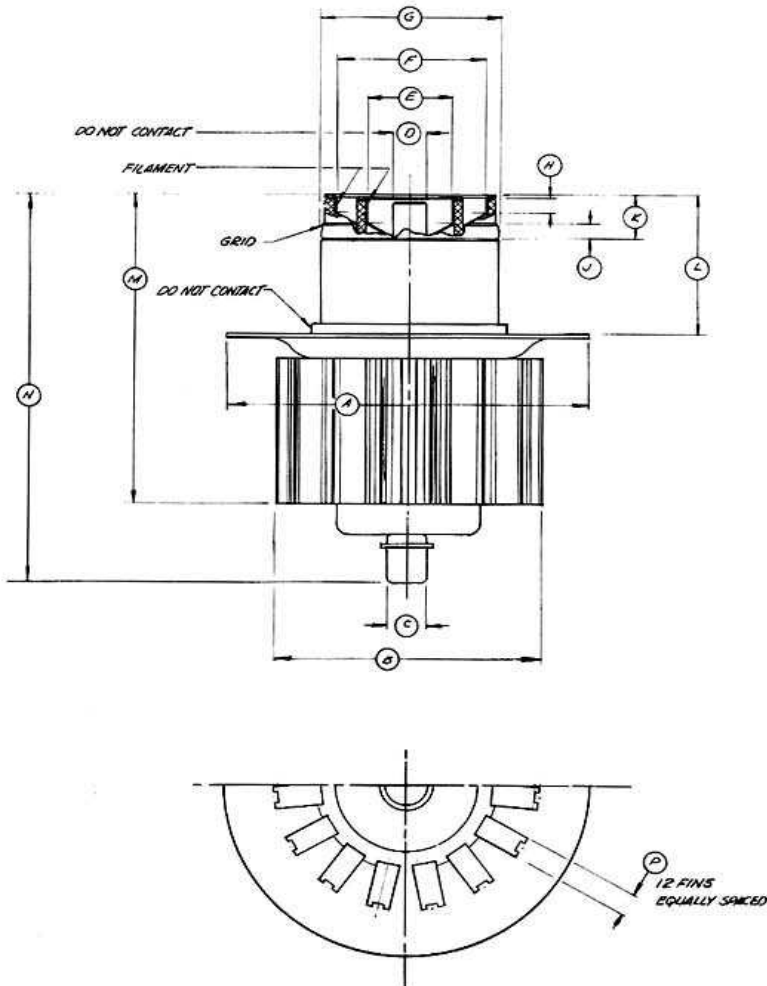
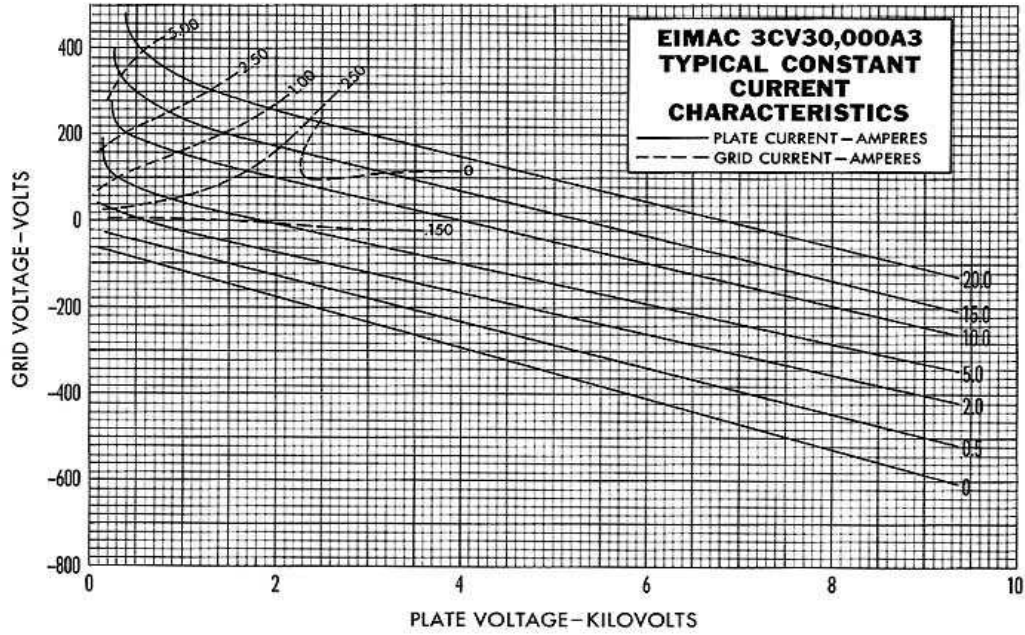
Separate cooling of the tube base is required and is accomplished by directing 30-50 CFM of cooling air into the base structure from the top of the socket.

SCHEMATIC OF TYPICAL EIMAC MULTI-TUBE VAPOR COOLING INSTALLATION





3CV30,000A3



DIMENSIONS IN INCHES

DIMENSIONAL DATA

REF.	MIN.	MAX.	NOM.
A			7.750
B			5.812
C	.855	.895	
D	.720	.760	
E	1.896	1.936	
F	3.133	3.173	
G	3.792	3.832	
H	.188		
J	.188		
K	.986	1.050	
L			3.062
M	6.920	6.990	
N	8.250	8.750	
P			.510