



EITEL-McCULLOUGH, INC.
SAN CARLOS, CALIFORNIA

3CW25,000A3

MEDIUM-MU

**WATER-COOLED
POWER TRIODE**

The Eimac 3CW25,000A3 is a water-cooled, ceramic-metal power triode designed primarily for use in industrial radio-frequency heating services. Its water-cooled anode is rated at 25 kilowatts of plate dissipation with low water flow and pressure drop.

Full input of 60 kilowatts is permissible up to 100 megacycles. Plentiful reserve emission is available from its one kilowatt filament. The grid structure is rated at 500 watts 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	$\mu\mu\text{f}$
Plate-Filament	1.2		1.5	$\mu\mu\text{f}$
Grid-Plate	30		38	$\mu\mu\text{f}$
Frequency for Maximum Ratings				100 Mc

MECHANICAL

Base	Coaxial
Recommended Socket	Eimac SK-1300
Operating Position	Vertical, base up or down
Cooling	Water & Forced air
Maximum Operating Temperatures:	
Ceramic-to-Metal Seals	250°C
Maximum Dimensions:	
Height	9.4 inches
Diameter	5.0 inches
Net Weight	12 pounds

TYPICAL OPERATION

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	25 KW

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



**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	16.5 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	25 MAX. KW
GRID DISSIPATION	500 MAX. WATTS

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

*Adjust to give specified zero-signal dc plate current

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 3CW-25,000A3 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.

High Frequency Operation—The 3CW25,000A3 is usable to 140 Mc. At this frequency, plate voltage must be reduced to 7000 volts in class A, B or C service. For plate-modulated applications at 140 Mc, plate voltage is reduced to 5500 volts.



Mounting—The 3CW25,000A3 must be mounted vertically, either base up or down. Where the tube is installed in a base up position, it is suggested that any clamping pressure or rf contact be made only in the area shown as “V” on the outline drawing.

Socket—The Eimac SK-1300 socket is used with the 3CW25,000A3 for making connections to the filament and grid. Where the socket is to be removable—as in base-up operation—the SK-1310 should be used.

Cooling—Anode cooling is accomplished by circulating water through the integral anode-water jacket. With the tube in the anode-up position the water inlet is the outer water fitting and the outlet will be the center water fitting. When the tube is mounted base up, these are reversed.

The table below lists the minimum water flow requirement for adequate anode cooling at various plate dissipation levels. In all cases, inlet water temperature must be limited to 60°C or below, outlet water temperature must not exceed 70°C nor should inlet water pressure exceed 60 psi.

Minimum Water-Cooling Requirement		
Plate Dissipation (kW)	Water Flow (GPM)	Pressure Drop (PSI)
10	6	0.2
15	9	0.4
20	12	0.7
25	15	1.1

Additional forced-air cooling of the tube’s base is also required to maintain ceramic-to-metal seal temperatures below the 250°C maximum. Approximately 50 cfm of cooling air directed into the base structure, through the socket will generally satisfy this requirement.

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



