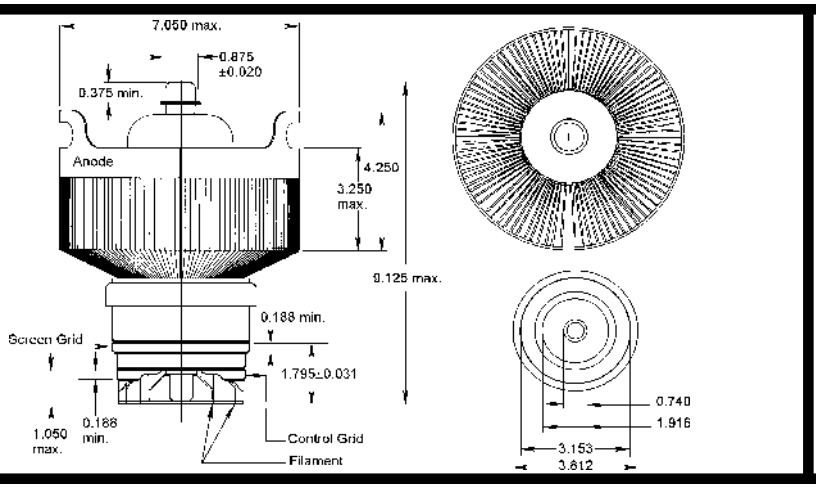

PL8171/ 4CX10,000D

Radial-Beam Power Tetrode

The Penta PL8171/4CX10,000D is a forced-air cooled, 10,000-watt plate dissipation, ceramic and metal tetrode. When a pair of these tubes is employed, they will provide some 30 kilowatts of AF or RF power with zero driving power.

The PL8171/4CX10,000D is especially well suited for use as an oscillator, amplifier, or modulator at frequencies up to and including 110 megahertz. The excellent characteristics of the PL8171/4CX10,000D provide outstanding performance in a linear single-sideband amplified Class AB_1 AF amplifier, or as a screen-modulated radio frequency amplifier.

ELECTRICAL CHARACTERISTICS

	Min.	Nom.	Max.	
Filament -- Thoriated Tungsten				
Voltage		7.5		volts
Current	73		78	amperes
Grid-Screen Amplification Factor		4.5		
Interelectrode Capacitances - - Grounded Grid and Screen				
Feedback			1.0	pF
Input	108		122	pF
Output	18		23	pF
Interelectrode Capacitances - - Grounded Cathode				
Feedback			0.16	pF
Input	48		58	pF
Output	18		23	pF

MECHANICAL CHARACTERISTICS

Base	Special
Maximum Overall Dimensions	
Length	9.15 inches
Diameter	7.05 inches
Net Weight	12 pounds
Mounting Position	Axis Vertical
Maximum Seal and Anode Temperature	250°C
Recommended Socket and Chimney	PL300A, PL1306
Required Air Flow at Maximum Dissipation	720 CFM

Revised 22 Nov 2022

P E N T A L A B O R A T O R I E S, I N C.

14399 PRINCETON AVENUE * MOORPARK * CALIFORNIA 93021

(800) 421-4219 * (818) 882-3872 * FAX: (818) 882-3968

ELECTRON TUBES FOR INDUSTRY

COOLING

Forced air cooling of the base, base seals, and other external tube surfaces is required for all classes of operation. The use of the PL300A socket and the PL1306 chimney, in conjunction with a blower capable of sustaining the required air flow is highly recommended. It should be noted that maintaining surface temperatures below the maximum values will substantially prolong the useful life of the tube.

The air flow required to sustain the tube surface temperature at 200°C (at sea level and for operation below 30 megahertz) have been tabulated below. It is necessary to keep in mind that high altitude operation, operation at frequencies exceeding 30 megahertz, or operation where ambient air temperatures exceed 50°C will require addition air flow to maintain the desired tube surface temperature.

PLATE DISSIPATION

Under most classes of operation, the maximum plate dissipation allowable for the PL8171/4CX10,000D is 10,000 watts; however, in SSB and audio amplifier applications, this maximum may be exceeded by 20%, thus allowing an effective 12,000 watts of plate dissipation. During tuning, plate dissipation may be permitted to rise above the stated maximums for brief periods of time.

SCREEN-GRID OPERATION

Under no conditions should the screen dissipation be allowed to exceed 250 watts. In that excessive screen dissipation is likely to result where plate voltage, plate load, or bias voltage are removed, suitable precautions should be taken to avoid these conditions while filament and screen voltages are applied.

CONTROL GRID OPERATION

The PL8171/4CX10,000D has a maximum control grid dissipation rating of 75 watts; failure to respect this maximum will result in damage to the tube. Tube life can be extended by maintaining grid bias and driving power at or near the recommended values whenever possible.

FILAMENT VOLTAGE

The PL8171/4CX10,000D is designed to operate with 7.5 volts applied to the filament. Under no circumstances should filament voltage be allowed to deviate from this value by more than 5%. The useful life of the tube can be extended by adhering to this value as closely as possible.

RECOMMENDED COOLING CONDITIONS

Dissipation	Air Flow	Pressure Drop
4000 Watts	115 CFM	0.4 Inches of H2O
6000	225	1.0
8000	365	2.0
10,000	500	3.5
12,000	725	6.0

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

RF Power Amplifier or Oscillator--Class C Telegraphy (Under 30 MHz)

Maximum Ratings (To 110 MHz)

DC Plate Voltage		
Under 30 MHz	7500	Volts
30 to 60 MHz	7000	Volts
60 to 110 MHz	6500	Volts
DC Screen Voltage	1500	Volts
DC Plate Current		
Under 30 MHz	3.0	Amperes
30 to 60 MHz	2.8	Amperes
60 to 110 MHz	2.6	Amperes
Plate Dissipation	10,000	Watts
Screen Dissipation	250	Watts
Grid Dissipation	75	Watts

Typical Operation (Under 30 MHz)

DC Plate Voltage	7500	Volts
DC Screen Voltage	500	Volts
DC Grid Voltage	-350	Volts
DC Plate Current	2.8	Amperes
DC Screen Current	0.5	Amperes
DC Grid Current	0.25	Amperes
Peak RF Grid Voltage	590	Volts
Driving Power	150	Watts
Plate Dissipation	5000	Watts
Plate Output Power	16,000	Watts

Plate Modulated RF Power Amplifier--Class C Telephony

Maximum Ratings

DC Plate Voltage	5000	Volts
DC Screen Voltage	1000	Volts
DC Plate Current	2.5	Amperes
Plate Dissipation	6650	Watts
Screen Dissipation	250	Watts
Grid Dissipation	75	Watts

Typical Operation (Frequencies below 30 MHz)

DC Plate Voltage	5000	Volts
DC Screen Voltage	500	Volts
Peak AF Screen Voltage (100% modulation)	450	Volts
DC Grid Voltage	-400	Volts
DC Plate Current	1.4	Amperes
DC Screen Current	0.26	Amperes
DC Grid Current	0.05	Amperes
Peak RF Grid Voltage	520	Volts
Grid Driving Power	25	Watts
Plate Dissipation	1100	Watts
Plate Output Power	5.8	Kilowatts

AF Amplifier or Modulator--Class AB_1

Maximum Ratings (Per Tube)

DC Plate Voltage	7500	Volts
DC Screen Voltage	1500	Volts
DC Plate Current	4.0	Amperes
Plate Dissipation	12,000	Watts
Screen Dissipation	250	Watts
Grid Dissipation	75	Watts

Typical Operation (Two Tubes)

DC Plate Voltage	4000	5000	6000	7500	Volts
DC Screen Voltage	1500	1500	1500	1500	Volts
DC Grid Voltage	-315	-320	-330	-340	Volts
Maximum Signal Plate Current	6.65	6.65	6.65	6.65	Amperes
Zero Signal Plate Current	0.50	0.50	0.50	0.50	Amperes
Maximum Signal Screen Current	0.33	0.32	0.30	0.25	Ampere
Zero Signal Plate Current	0	0	0	0	Amperes
Peak AF Driving Voltage	305	310	320	330	Volts
Driving Power	0	0	0	0	Watts
Load Resistance, Plate to Plate	940	1320	1700	2280	Ω
Maximum Signal Plate Dissipation	6670	7950	8100	9050	Watts
Maximum Signal Plate Output Power	13,300	17,500	28,800	31,900	Watts

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RF Linear Amplifier--Class AB_1

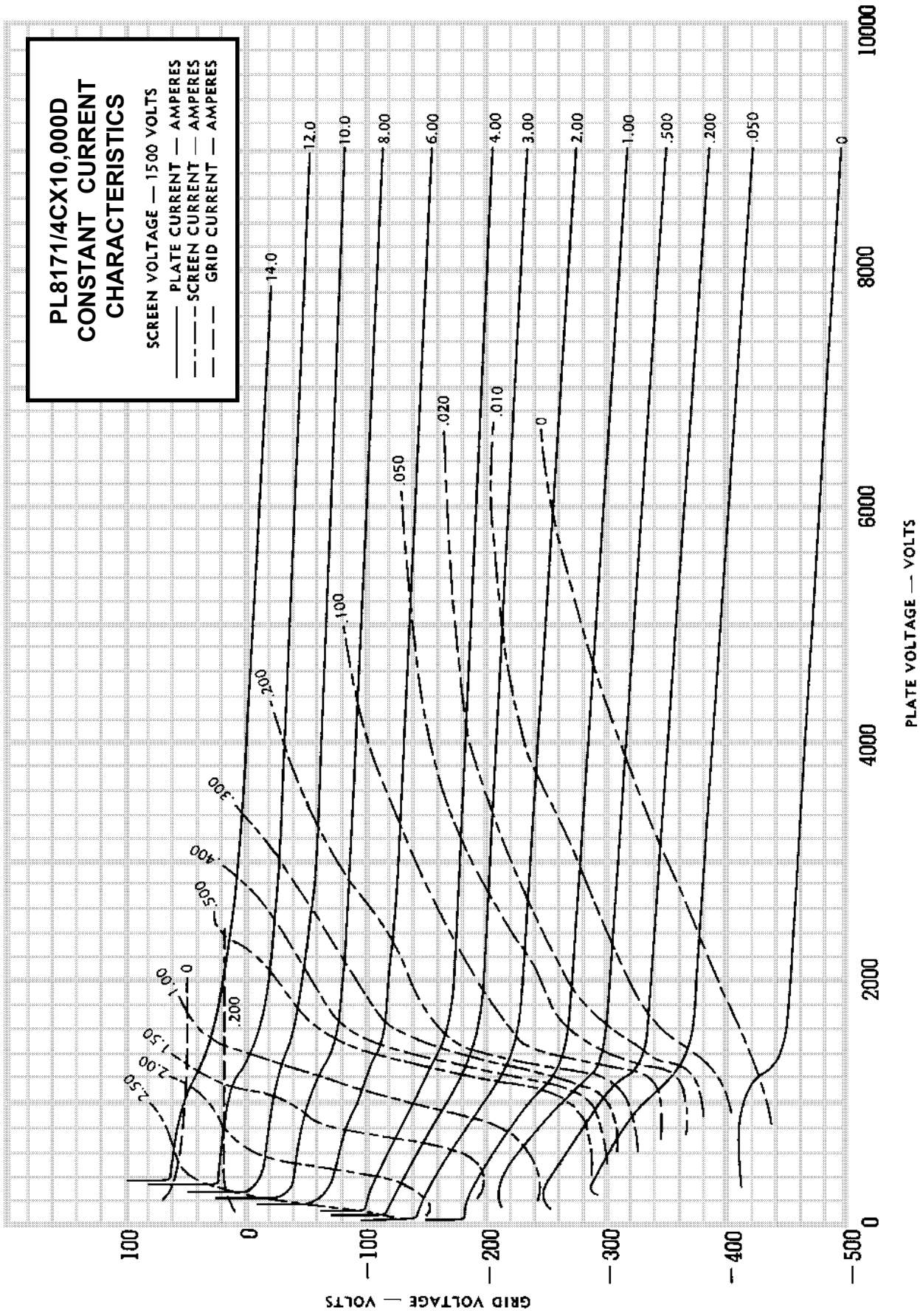
Maximum Ratings

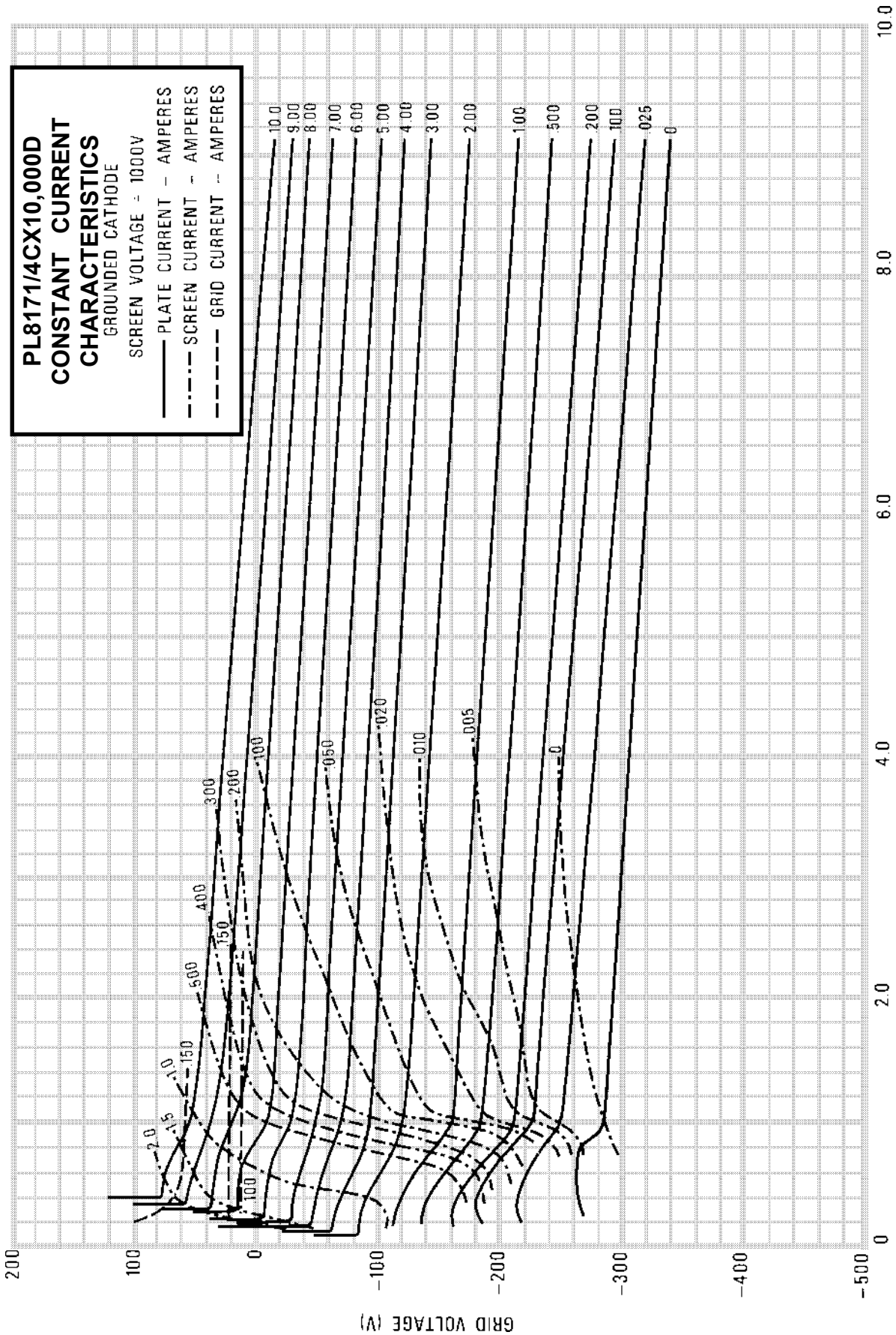
DC Plate Voltage	7500	Volts
DC Screen Voltage	1500	Volts
DC Plate Current	4.0	Amperes
Plate Dissipation	12,000	Watts
Screen Dissipation	250	Watts
Grid Dissipation	75	Watts

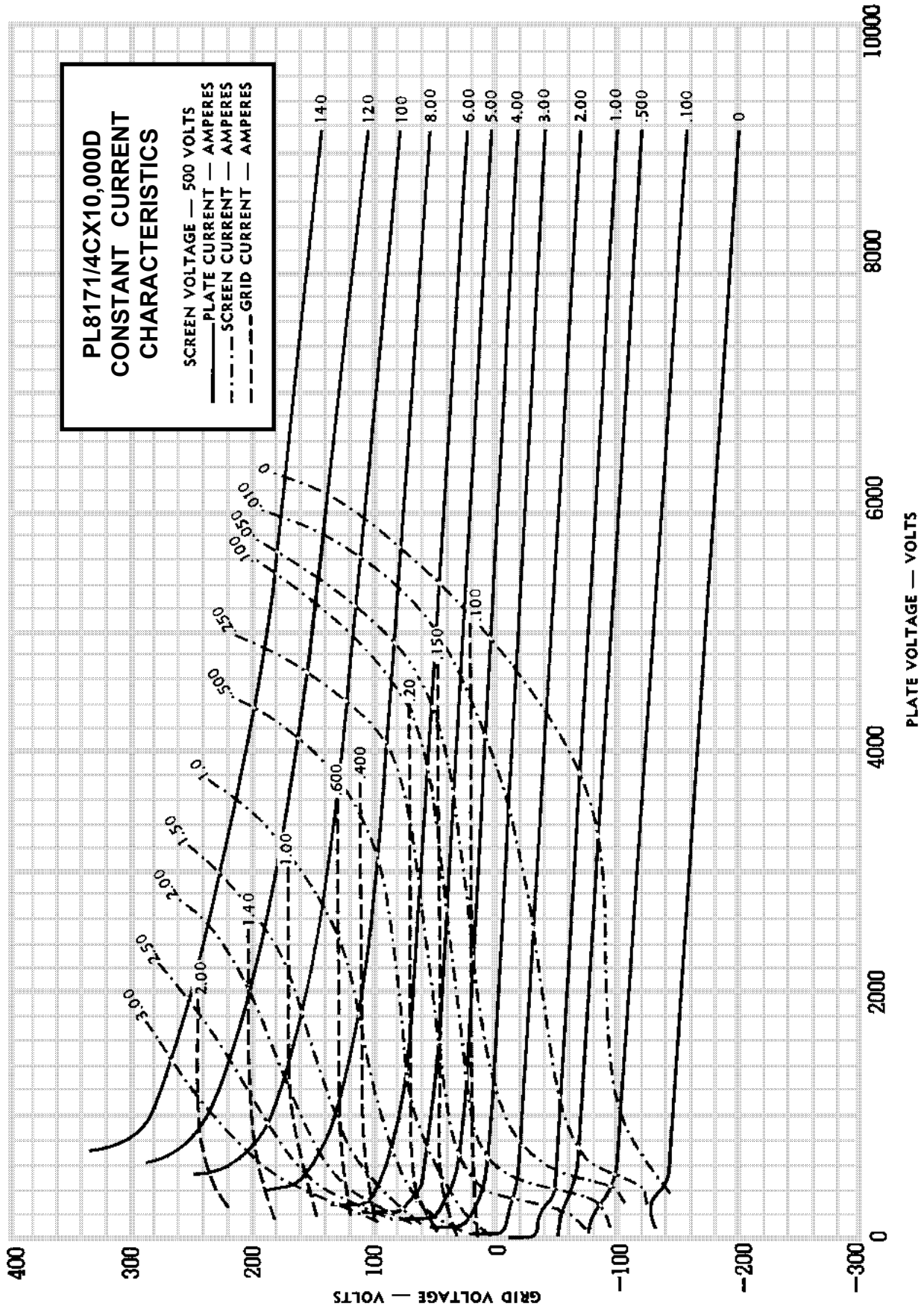
Typical Operation (Frequencies below 30 MHz)

DC Plate Voltage	7500	Volts
DC Screen Voltage	1500	Volts
DC Grid Voltage	-340	Volts
Maximum Signal Plate Current	3.30	Amperes
Zero Signal Plate Current	0.50	Ampere
Maximum Signal Screen Current	0.125	Ampere
Peak RF Grid Voltage	330	Volts
Driving Power	0	Watts
Plate Dissipation	9025	Watts
Plate Output Power	15,950	Watts

PL8171/4CX10,000D




PL8171/4CX10,000D
CONSTANT CURRENT
CHARACTERISTICS
GROUNDED CATHODE
SCREEN VOLTAGE = 1000V
PLATE CURRENT – AMPERES
SCREEN CURRENT – AMPERES
GRID CURRENT – AMPERES
10.0
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
.500
.200
.100
.025
0
.005
.010
.020
.050
.100
.200
.300
.400
.500
1.0
1.5
2.0
.150
200
100
0
-100
-200
-300
-400
-500
0
2.0
4.0
6.0
8.0
10.0
GRID VOLTAGE (V)
PLATE VOLTAGE (kV)


PL8171/4CX10,000D
CONSTANT CURRENT
CHARACTERISTICS
SCREEN VOLTAGE — 500 VOLTS
PLATE CURRENT — AMPERES
SCREEN CURRENT — AMPERES
GRID CURRENT — AMPERES
14.0
12.0
10.0
8.00
6.00
5.00
4.00
3.00
2.00
1.00
.500
.100
0
PLATE VOLTAGE — VOLTS
GRID VOLTAGE — VOLTS