



Amperex[®] ELECTRONIC CORPORATION

230 DUFFY AVENUE, HICKSVILLE, L. I., N. Y.

The Amperex 7580W is a compact forced air-cooled, ceramic and metal beam power tetrode. The 7580W was designed specifically for use in class AB1 linear amplifiers where shock and/or vibration preclude the use of non-ruggedized tube types. The 7580W replaces the 7580 in all applications since it is electrically identical.

The 7580W will operate with maximum rated plate and screen voltages applied in equipment where shock and/or vibration are experienced.

GENERAL CHARACTERISTICS

MECHANICAL

Dimensions	See outline drawing
Mounting Position	Any
Cooling ¹	Forced air
Maximum Operating Temperatures	
Ceramic to Metal Seals	250°C
Anode Core	250°C
Net Weight (approx.)	4 ounces
Shipping Weight (approx.)	20 ounces
Accessories	
Socket	Johnson 124-110-1, 124-112-1 or equal

ELECTRICAL

Cathode	Coated, unipotential
Heater	
Heater Voltage	
Less than 300 Mc	6.0 ± 10% volts
300 - 400 Mc	5.75 volts
400 - 500 Mc	5.50 volts
Heater Current at 6.0 volts	2.6 amps
Minimum Heating Time	30 seconds
Cathode to Heater Voltage	± 150 volts
Amplification Factor (Grid No. 1 to Grid No. 2) for Grid No. 2 Voltage = 300V, Grid No. 2 Current = 50 ma, Anode Floating	4
Direct Interelectrode Capacitances	
Grid No. 1 to Plate	0.03 pf
Input	17.3 pf
Output	4.5 pf

¹ At sea level, with an inlet air temperature of 20°C (68°F), and air-flow rate of 4 cfm (Base-to-Anode Direction) through the anode cooler is required to cool the tube when operating at rated maximum plate dissipation. Under these conditions, 4 cfm corresponds to a pressure difference across the anode cooler of 0.12 inch of water column. Sufficient air must be circulated to the base of the tube to maintain desired seal temperatures; required air flow depends upon socket design.

SHOCK AND VIBRATION

The 7580W is tested for shock and vibration with maximum rated plate and screen voltages applied.

Samples of production tubes are periodically selected at random and tested under the conditions outlined below.

Shock

1. With maximum rated plate and screen voltages and the control grid at -200 Vdc.
 - a. The tubes are subjected to six shocks of a minimum of 90 g's approximate half sine wave motion.
 - b. The duration of each shock is 11 ± 2 milliseconds in each of the three major axes (X1, X2, Y1).

Vibration

1. With maximum rated plate and screen voltages applied and the control grid voltage adjusted to maintain a flow of 100 ma through a 4.9 k ohm plate load resistor.
 - a. The tubes are subjected to vibration in the three major axes (X1, X2, Y1) through the range of 10 - 1000 - 10 cps in a time of six minutes (minimum) per axis.
 - b. The vibration level is maintained at 10 g's from 28 cps to 1000 cps and at 1/4 inch double amplitude from 5 cps to 28 cps.
 - c. During this test a noise voltage of no more than 30 volts RMS can develop across the 4.9 k ohm load resistor.

Class AB₁ Linear RF Amplifier
Single Sideband Suppressed Carrier Operation
Maximum Ratings, Absolute Values
(Frequency Up to 500 Mc)

	<u>CCS</u>
DC Plate Voltage	2000 volts
DC Grid No. 2 Voltage	500 volts
Negative DC Grid No. 1 Voltage	250 volts
DC Plate Current at Peak of Envelope ^a	350 ma
Average DC Plate Current	250 ma

Typical Operation
Single Tone and/or Two Tone Modulation

Frequency	30	500 Mc
Heater Voltage	6.0	5.5 volts
DC Plate Voltage	2000	2000 volts
DC Grid No. 2 Voltage	400	400 volts
Negative DC Grid No. 1 Voltage	77	77 volts
Zero Signal DC Plate Current	70	70 ma
Effective RF Load Resistance	3050	3050 ohms

^a The maximum rating for a signal having a minimum peak-to-average power ratio less than 2, such as obtained in "Single Tone Modulation" operation is 250 ma. During short periods of circuit adjustment under "Single Tone" conditions, the average plate current may be as high as 350 ma.

Single Tone Modulation

Max. Signal DC Plate Current ^a	350	350 ma
Max. Signal DC Grid No. 2 Current	35	25 ma
Max. Signal Peak RF Grid Voltage	77	77 volts
Max. Signal Driving Power ^a	1	12 watts
Max. Signal Plate Power Output	400	360 watts

Two Tone Modulation

Average DC Plate Current	225	225 ma
Average DC Grid No. 2 Current	16	10 ma
Average Grid No. 1 Current ⁴	0.05	0.05 ma
Approximate Tank Circuit Efficiency	95	85 %
Average Useful Power Output ⁵	200	180 watts
Peak Envelope Useful Power Output ⁵	400	360 watts
3rd Order Intermodulation Distortion	21	-- db
5th Order Intermodulation Distortion	29	-- db

Linear RF Power Amplifier - AM Telephony

Carrier Conditions per Tube for Use with a Max. Modulation Factor of 1.0

Maximum Ratings, Absolute Values
(For altitudes up to 20,000 ft.)
(Frequency Up to 500 Mc)

	<u>CCS</u>
DC Plate Voltage	2000 volts
DC Grid No. 2 Voltage	500 volts
Negative DC Grid No. 1 Voltage	250 volts
DC Plate Current	180 ma
Plate Dissipation	250 watts
Grid No. 2 Dissipation	12 watts
Grid No. 1 Dissipation	2 watts
Peak Heater-Cathode Voltage (Heater Negative with Respect to Cathode)	150 volts
Peak Heater-Cathode Voltage (Heater Positive with Respect to Cathode)	150 volts

Typical Operation

	<u>CCS</u>	<u>CCS</u>
Frequency	30	500 Mc
Heater Voltage	6.0	5.5 volts
DC Plate Voltage	2000	2000 volts
DC Grid No. 2 Voltage	400	400 volts
Negative DC Grid No. 1 Voltage (From Fixed Supply)	77	77 volts
DC Plate Current	175	175 ma
DC Grid No. 2 Current	6	4 ma
Effective RF Load Resistance	3050	3050 ohms
Driver Power Output (approx.) ³	0.25	3 watts
Output-Circuit Efficiency (approx.)	95	85 %
Useful Power Output (approx.) ⁶	100	90 watts

³ Driver power output represents circuit losses and is the actual power measured at input to grid No. 1 circuit of the 7580W. The actual power required depends on the operating frequency and the circuit used. The tube driving power is approximately zero watts.

⁴ This value represents the approximate grid No. 1 current obtained due to initial electron velocities and contact-potential effects when grid No. 1 is driven to zero volts at maximum signal.

⁶ This value is measured at the load of the output circuit.

Maximum Circuit Values

Grid No. 1 Circuit Resistance Under Any Conditions:

With Fixed Bias
With Cathode Bias

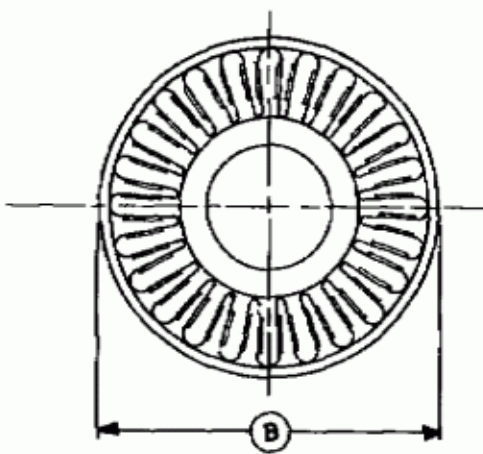
25,000 ohms
not recommended

Characteristic Range Values for Equipment Design

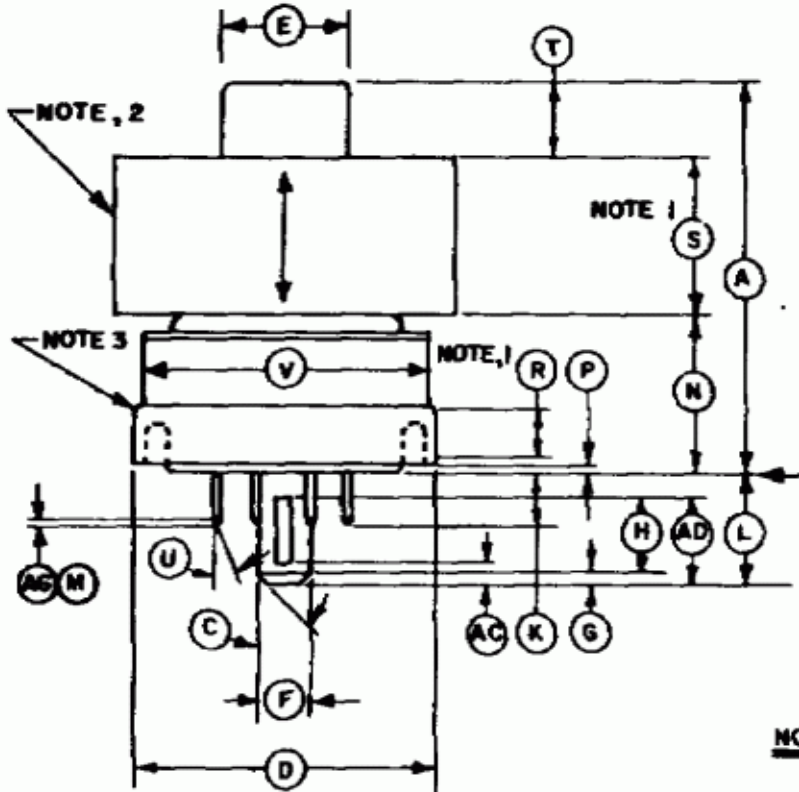
	<u>Conditions</u>	<u>Min.</u>	<u>Max.</u>
Heater Current	A, E	2.3	2.9 amps
Direct Interelectrode			
Grid No. 1 to Plate	----	--	0.06 pf
Input	----	16.0	13.5 pf
Output	----	4.0	5.0 pf
Negative Grid No. 1 Voltage	A, B, E, F	70	100 volts
Positive Grid No. 1 Voltage	A, E, F, G	2	9 volts
Grid No. 2 Current (1)	A, C, E, F	-7	-3 ma
Grid No. 2 Current (2)	A, E, F, G	--	260 ma
Grid No. 1 Current	A, E, F, G	--	150 ma
Useful Power Output	D, E, F	225	-- watts

CONDITIONS

- Condition A: With 6.0 volts on heater.
- Condition B: With dc plate voltage of 2000 volts, dc grid No. 2 voltage of 400 volts, and grid No. 1 voltage adjusted to give plate current of 67 ma.
- Condition C: With dc plate voltage of 100 volts, dc grid No. 2 voltage of 300 volts, and grid No. 1 voltage adjusted to give plate current of 150 ma.
- Condition D: With heater voltage of 5.5 volts, dc plate voltage of 2000 volts, dc grid No. 2 voltage of 300 volts, dc grid No. 1 bias of -90 volts, dc grid No. 1 current of 25 ma maximum, grid No. 1 signal voltage adjusted to produce dc plate current of 250 ma, and coaxial cavity amplifier circuit operating at a frequency of 475 Mc.
- Condition E: With forced-air cooling.
- Condition F: Heater voltage must be applied for at least 30 seconds before application of other voltages.
- Condition G: With dc plate voltage of 250 volts, dc grid No. 2 voltage of 250 volts, and grid No. 1 voltage adjusted to give peak plate current of 1.0 ampere. This test is performed using pulse technique to prevent tube damage. Rectangular pulses of 4500 μ s duration at a repetition rate of 11 + 1 pps are used.



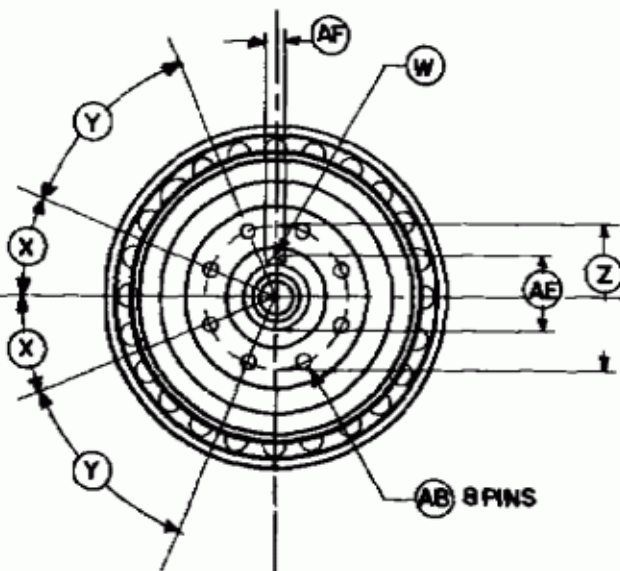
DIMENSIONS IN INCHES		
REF.	MIN.	MAX
A	1.810	1.910
B	1.610 DIA.	1.640 DIA.
C	30°	
D	1.417 DIA.	1.433 DIA.
E	.559 DIA.	.573 DIA.
F	.255 DIA.	.265 DIA.
G	.031	
H	.360	
K		.250
L	.514	.554
M	.035	
N	.750	.810
P	.080 NOM.	
R	.187	
S	.710	.790
T	.240	
U	22.5°	
V		1.408 DIA.
W		.043 R.
X	22.5°	
Y	45°	
Z	.680 DIA.	.694 DIA.
AB	.045 DIA.	.053 DIA.
AC	.068	.108
AD		.456
AE	.298	.308
AF	.078	.086
AG	.005 R (ALT. TO M & U)	



REFERENCE SURFACE

NOTES:

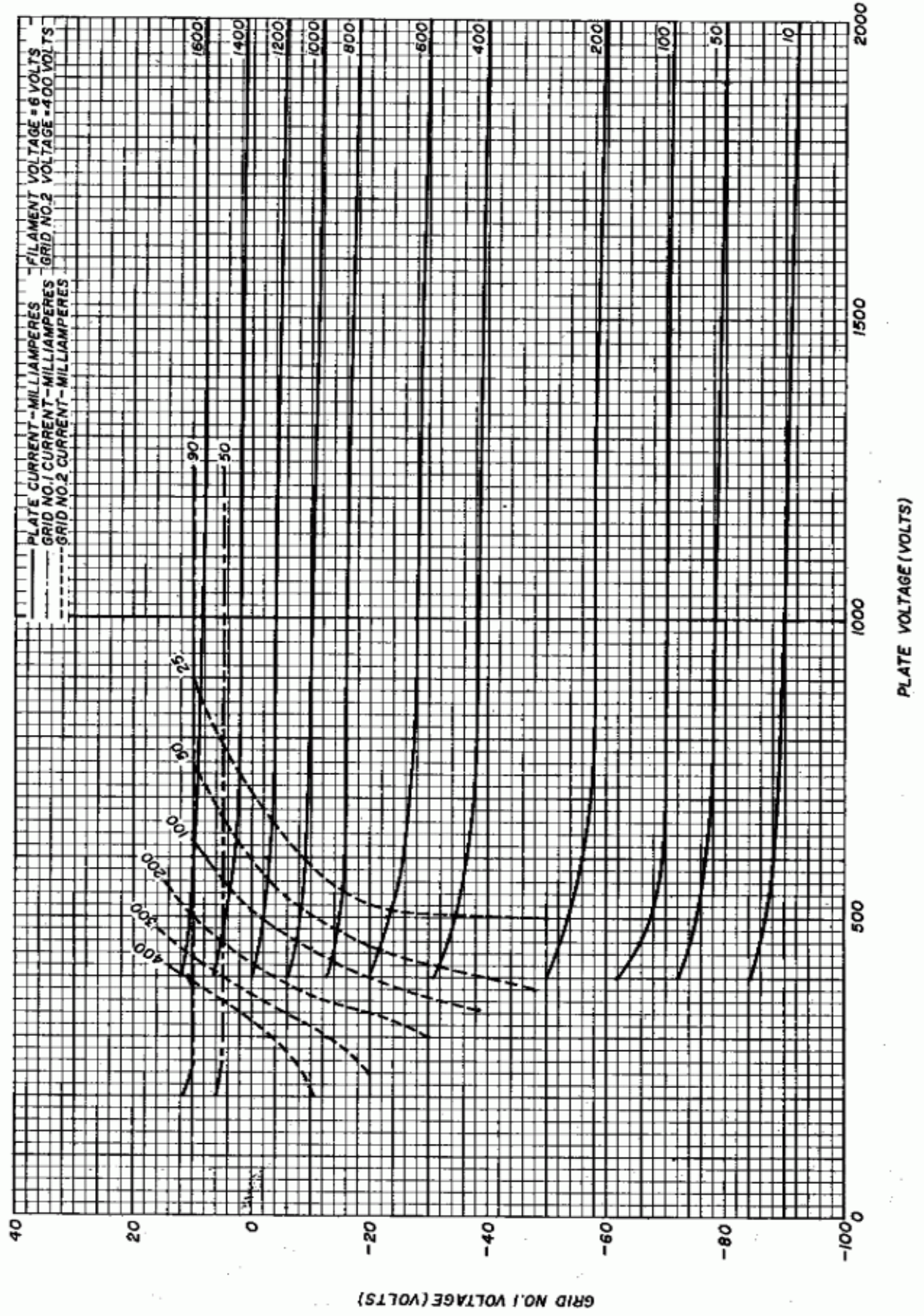
- 1.- CONTACT SURFACE.
- 2.- ANODE COOLER.
- 3.- SCREEN GRID CONTACT OUTER CYLINDRICAL SURFACE ONLY.



PIN CONNECTIONS

- 1.- SCREEN GRID
 - 2.- CATHODE
 - 3.- HEATER
 - 4.- CATHODE
 - 5.- DO NOT USE FOR EXTERNAL CONNECTIONS
 - 6.- CATHODE
 - 7.- HEATER
 - 8.- CATHODE
- CENTER PIN: CONTROL GRID

CONSTANT CURRENT CHARACTERISTICS



CONSTANT CURRENT CHARACTERISTICS

