

AMPEREX TUBE TYPE 6078

The 6078 is a three-electrode, forced-air cooled tube designed for use as a radio-frequency power amplifier, oscillator and modulator. The anode is capable of dissipating 45 kw. The cathode is a thoriated-tungsten filament. Maximum ratings apply up to 15 Mc. At reduced ratings it may be operated up to 30 megacycles.

GENERAL CHARACTERISTICS

ELECTRICAL DATA

Filament Voltage	16.6	17.5	18.4	volts
Filament Current at Bogey Voltage	180	196	212	amperes
Filament Starting Current ¹	—	—	420	amperes
Filament Cold Resistance	—	0.012	—	ohms
Amplification Factor (Ib=5 amps., Eb=10 kv.)	23	27	31	
Peak Cathode Current ²	—	—	120	amperes
Direct Interelectrode Capacitances				
Grid-Plate	77	86	95	$\mu\mu f$
Grid-Filament	98	116	134	$\mu\mu f$
Plate-Filament	2.5	3.4	4.3	$\mu\mu f$

MECHANICAL DATA

Mounting Position—vertical, anode down

Air Cooling of Anode—Cooling must be started before filament voltage is applied, and continued for 5 minutes after filament voltage is removed.

COOLING DATA

Plate Dissipation (kilowatts)	Elevation (feet)	Max. Inlet Air Temperature (degrees C.)	Air Flow (cu. ft./min.)	Inlet Air Pressure (inches water)
30	0	35	1235	4.45
	0	45	1412	5.58
	5,000	35	1483	5.3
	10,000	25	1553	5.15
45	0	35	1907	10.72
	0	45	2205	13.1
	5,000	35	2277	12.56
	10,000	25	2401	12.44

Above 6 Mc the anode and grid-seals must be cooled. This is accomplished by air flowing through the slots provided at the top of the air flow chamber. In certain cases, e.g. at low anode dissipation and cooling with the minimum quantity of air, the air flow to the seals will not be sufficient to maintain the seal temperature below the max. permissible value at frequencies above 6 Mc. Consequently, in these cases, a larger quantity of air must be supplied.

Glass Temperature at Seals max. 180° C.

Net Weight (approx.) 66 Pounds

ACCESSORIES

Air Flow Chamber Amperex #S-3740

Filament Connector Amperex #S-3739

¹Peak value.²Represents maximum usable cathode current (plate current plus grid current) for any condition of operation.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

Audio-Frequency Power Amplifier and Modulator—Class B

Maximum Ratings, Absolute Values

D.C. Plate Voltage	12 kilovolts max.
Maximum Signal D.C. Plate Current ¹	12 amperes max.
Maximum Signal Plate Input ¹	162 kilowatts max.
Plate Dissipation	45 kilowatts max.

Typical Operation

Unless otherwise specified, values are for two tubes.

	CCS	CCS	CCS
D.C. Plate Voltage	8	8.5	9 kilovolts
D.C. Grid Voltage	-300	-325	-350 volts
Peak A-F Grid to Grid Voltage	1120	1200	1300 volts
Zero Signal D.C. Plate Current	0.5	0.5	0.5 amperes
Maximum Signal D.C. Plate Current	8.2	6.8	9.6 amperes
Effective Load Resistance, Plate to Plate	2210	2120	2080 ohms
Maximum Signal Driving Power, approximate	0.5	0.6	0.8 kilowatts
Maximum Signal Power Output, approximate	46.8	54	62 kilowatts
D.C. Plate Voltage	10	10	12 kilovolts
D.C. Grid Voltage	-400	-375	-450 volts
Peak A-F Grid to Grid Voltage	1450	1480	2060 volts
Zero Signal D.C. Plate Current	0.4	1	1.3 amperes
Maximum Signal D.C. Plate Current	10.8	13.2	24 amperes
Effective Load Resistance, Plate to Plate	2050	1780	1250 ohms
Maximum Signal Driving Power, approximate	1	1.2	4.8 kilowatts
Maximum Signal Power Output, approximate	77	93	202 kilowatts

Plate-Modulated Radio-Frequency Power Amplifier—Class C Telephony

Carrier conditions per tube for use with a maximum modulation factor of 1.0.

Maximum Ratings. Absolute Values

	CCS
D.C. Plate Voltage	10 kilovolts max.
D.C. Grid Voltage	—1200 volts max.
D.C. Plate Current	9 amperes max.
D.C. Grid Current	3 amperes max.
Plate Input	90 kilowatts max.
Plate Dissipation	30 kilowatts max.

Typical Operation

D.C. Plate Voltage	10 kilovolts
D.C. Grid Voltage	- 1050 volts
Peak R-F Grid Voltage	1750 volts
D.C. Plate Current	8.5 amperes
D.C. Grid Current, approximate	2.6 amperes
Driving Power, approximate	4.1 kilowatts
Power Output, approximate	65 kilowatts

Radio-Frequency Power Amplifier and Oscillator—Class C Telegraphy

Key-down conditions per tube without amplitude modulation¹

Maximum Ratings. Absolute Values

D.C. Plate Voltage	12 kilovolts max.
D.C. Grid Voltage	-1250 volts max.
D.C. Plate Current	12 amperes max.
D.C. Grid Current	3 amperes max.
Plate Input	144 kilowatts max.
Plate Dissipation	45 kilowatts max.

Typical Operation

D.C. Plate Voltage	12 kilovolts
D.C. Grid Voltage	-1000 volts
Peak R.F. Grid Voltage	170 volts
D.C. Plate Current	12 amperes
D.C. Grid Current, approximate	2.25 amperes
Driving Power, approximate	3.5 kilowatts
Power Output, approximate	108 kilowatts

Maximum ratings apply up to 15 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced according to the tabulation below (other maximum ratings are the same as shown above). Special attention should be given to adequate ventilation of the bulb at these frequencies.

At frequencies up to 4 megacycles the plate voltage and input in Class C telegraphy and as radio-frequency Class B amplifier may be increased as mentioned under these headings.

Frequency	15	20	30	megacycles
Percentage of Maximum Rated Plate Voltage				
Class B	100	100	83	per cent
Class C Plate Telephony	100	100	80	per cent
Class C Telegraphy	100	100	83	per cent
Percentage of Maximum Rated Plate Input				
Class B	100	87	47	per cent
Class C Plate Telephony	100	82	50	per cent
Class C Telegraphy	100	87	47	per cent

Characteristic Range Values for Equipment Design

Characteristic	Conditions	Ec:	Limits	
			Min. Req'd	Max.
Grid Voltage	Eb=2.5 kilovolts Ib=70 amperes	Ec:	—	980 volts
Grid Current	Eb=2.5 kilovolts Ib=70 amperes	Ic:	—	15 amperes
Plate Voltage	Ec=0 volt Ib=5 amperes	Ec:	2.6	3.1 3.6 kilovolts
Grid Voltage	Eb=12 kilovolts Ib=2 amperes	Ec:	-280	-130 -375 volts
Plate Power Output	Eb=12 kilovolts Ec=-1000 volts Ib: 12 amperes Ic=2.25 amperes f=15 megacycles	Po:	100	— kilowatts
Plate Power Output	Eb=10 kilovolts Ec=-600 volts Ib=6.7 amperes Ic=1.4 amperes f=30 megacycles	Po:	45	— kilowatts
Plate Current	Eb=12 kilovolts Ec=-500 volts	Ib:	—	0.25 amperes

¹ Averaged over any audio-frequency cycle of sine-wave form.

*Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115 per cent of the carrier conditions.

*At frequencies up to 4 megacycles the plate voltage and the plate input may be increased to 15 kilovolts and 185 kilowatts respectively.

