

# AMPEREX TUBE TYPE 6077

The 6077 is a three-electrode water-cooled tube designed for use as a radio-frequency power amplifier, oscillator and modulator. The anode is capable of dissipating 50 kilowatts in class C telegraphy during Continuous Commercial Service. In radio-frequency class B operation, a plate dissipation of 100 kilowatts may be tolerated. The cathode is a thoriated-tungsten filament. Maximum ratings apply up to 15 megacycles. At reduced ratings it may be operated up to 30 megacycles.

## GENERAL CHARACTERISTICS

### ELECTRICAL DATA

	Min.	Bogey	Max.	
Filament Voltage . . . . .	16.6	17.5	18.4	volts
Filament Current at Bogey Voltage . . . . .	180	196	212	amperes
Filament Starting Current <sup>1</sup> . . . . .	—	—	420	amperes
Filament Cold Resistance . . . . .	—	0.012	—	ohms
Amplification Factor (I <sub>b</sub> =5 amps., E <sub>b</sub> =10 kv.) . . . . .	23	27	31	
Peak Cathode Current <sup>2</sup> . . . . .	—	—	120	amperes
Direct Interelectrode Capacitances				
Grid-Plate . . . . .	77	86	95	μμf
Grid-Filament . . . . .	98	116	134	μμf
Plate-Filament . . . . .	2.5	3.4	4.3	μμf

### MECHANICAL DATA

Mounting Position . . . . . vertical, anode down

### COOLING DATA<sup>3</sup>

	30		50		100		kilowatts
	20	50	20	50	20	50	
Inlet Temperature . . . . .	20	50	20	50	20	50	° C.
Water Flow . . . . .	6.6	12	8.5	17.0	15	32	min. gpm
Water Pressure . . . . .	2.2	6.6	3.7	12.5	8.8	44	max. psi
Inlet Water Temperature . . . . .							max. 50° C.

Air Cooling: Above 6 megacycles the anode-seal and grid-seal must be cooled. (Air supply through the anti-corona ring, attached to the tube.) Air flow must be applied before or simultaneously with filament voltage.

Air Flow required (at 30 megacycles) . . . . .	min. 95 cfm
Pressure . . . . .	20 inches water
Glass Temperature at Seals . . . . .	max. 180° C.
Net Weight (approx.) . . . . .	31 Pounds

### ACCESSORIES

Water Jacket . . . . .	Amperex #S-3738
Filament Connector . . . . .	Amperex #S-3739

<sup>1</sup>Peak value.  
<sup>2</sup>Represents maximum usable cathode current (plate current plus grid current) for any condition of operation.  
<sup>3</sup>Water flow must be started before filament voltage is applied, and continued for 5 minutes after filament voltage is removed.

## MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

### Audio-Frequency Power Amplifier and Modulator—Class B

	Maximum Ratings, Absolute Values		
	CCS		
D.C. Plate Voltage	12 kilovolts max.		
Maximum Signal D.C. Plate Current <sup>1</sup>	12 amperes max.		
Maximum Signal Plate Input <sup>1</sup>	162 kilowatts max.		
Plate Dissipation	50 kilowatts max.		

### Typical Operation

Unless otherwise specified, values are for two tubes.

	Maximum Ratings, Absolute Values		
	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	8.8	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	1460	1480	2060 volts
Zero Signal D.C. Plate Current	0.4	1.0	1.3 amperes
Maximum Signal D.C. Plate Current	10.8	13.2	24 amperes
Effective Load Resistance, Plate to Plate	2060	1700	1200 ohms
Maximum Signal Driving Power, approximate	1	1.2	4.8 kilowatts
Maximum Signal Power Output, approximate	77	93	202 kilowatts

### Radio-Frequency Power Amplifier—Class B

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

### Maximum Ratings, Absolute Values

	Maximum Ratings, Absolute Values		
	CCS		
D.C. Plate Voltage	12 kilovolts max. <sup>2</sup>		
D.C. Plate Current	12.5 amperes max.		
Plate Input	150 kilowatts max. <sup>2</sup>		
Plate Dissipation	100 kilowatts max.		

### Typical Operation

	Maximum Ratings, Absolute Values		
	CCS		
D.C. Plate Voltage	12 kilovolts		
D.C. Grid Voltage	—420 volts		
Peak R.F. Grid Voltage	700 volts		
D.C. Plate Current	12.2 amperes		
D.C. Grid Current, approximate	0.5 amperes		
Driving Power, approximate <sup>3</sup>	5.7 kilowatts		
Power Output, approximate	51.5 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

	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	33 kilowatts max.		

### Typical Operation

	Maximum Ratings, Absolute Values		
	CCS		
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	2.8 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 modulation<sup>1</sup>

### Maximum Ratings, Absolute Values

	Maximum Ratings, Absolute Values		
	CCS		
D.C. Plate Voltage	12 kilovolts max. <sup>2</sup>		
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. <sup>2</sup>		
Plate Dissipation	50 kilowatts max.		

### Typical Operation

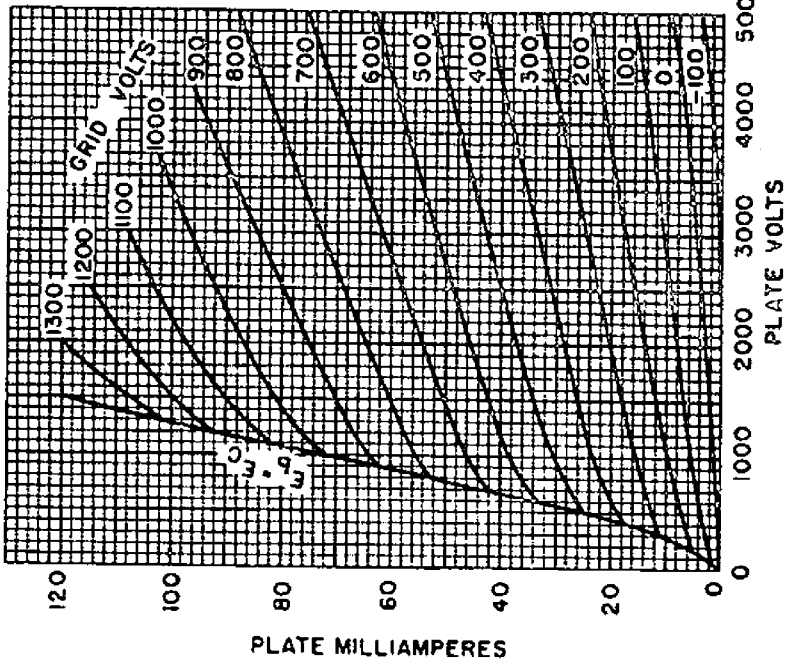
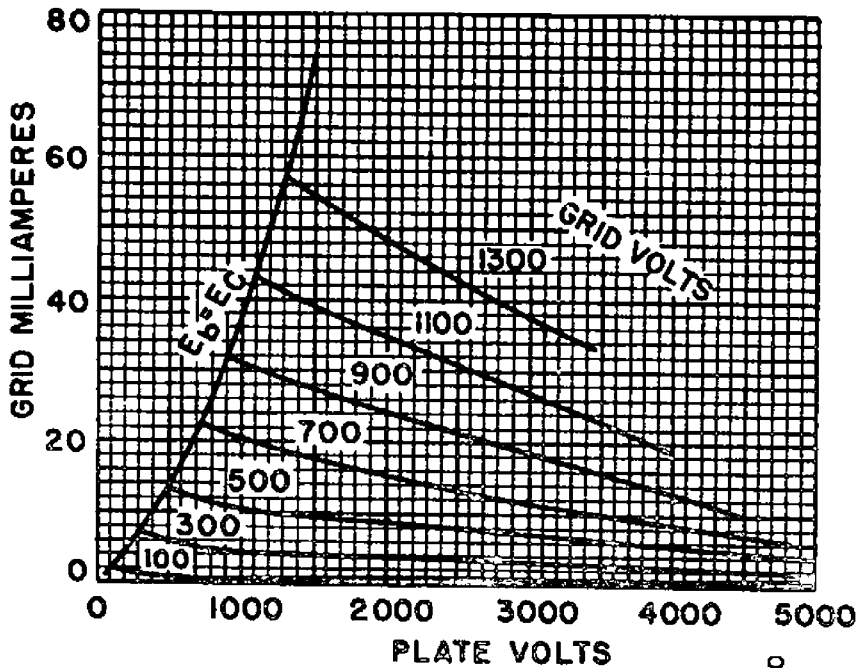
	Maximum Ratings, Absolute Values		
	CCS		
D.C. Plate Voltage	12 kilovolts		
D.C. Grid Voltage	—1000 volts		
Peak R.F. Grid Voltage	1700 volts		
D.C. Plate Current	12 amperes		
D.C. Grid Current, approximate	2.25 amperes		
Driving Power, approximate	3.5 kilowatts		
Power Output, approximate	108 kilowatts		

<sup>1</sup>Averaged over any audio-frequency cycle of sine-wave form.  
<sup>2</sup>At frequencies up to 4 megacycles the plate voltage and the plate input may be increased to 15 kilovolts and 180 kilowatts respectively.

<sup>3</sup>At crest of audio-frequency cycle with modulation factor of 1.0.

<sup>4</sup>Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115 per cent of the carrier conditions.

<sup>5</sup>At frequencies up to 4 megacycles the plate voltage and the plate input may be increased to 15 kilovolts and 180 kilowatts respectively.



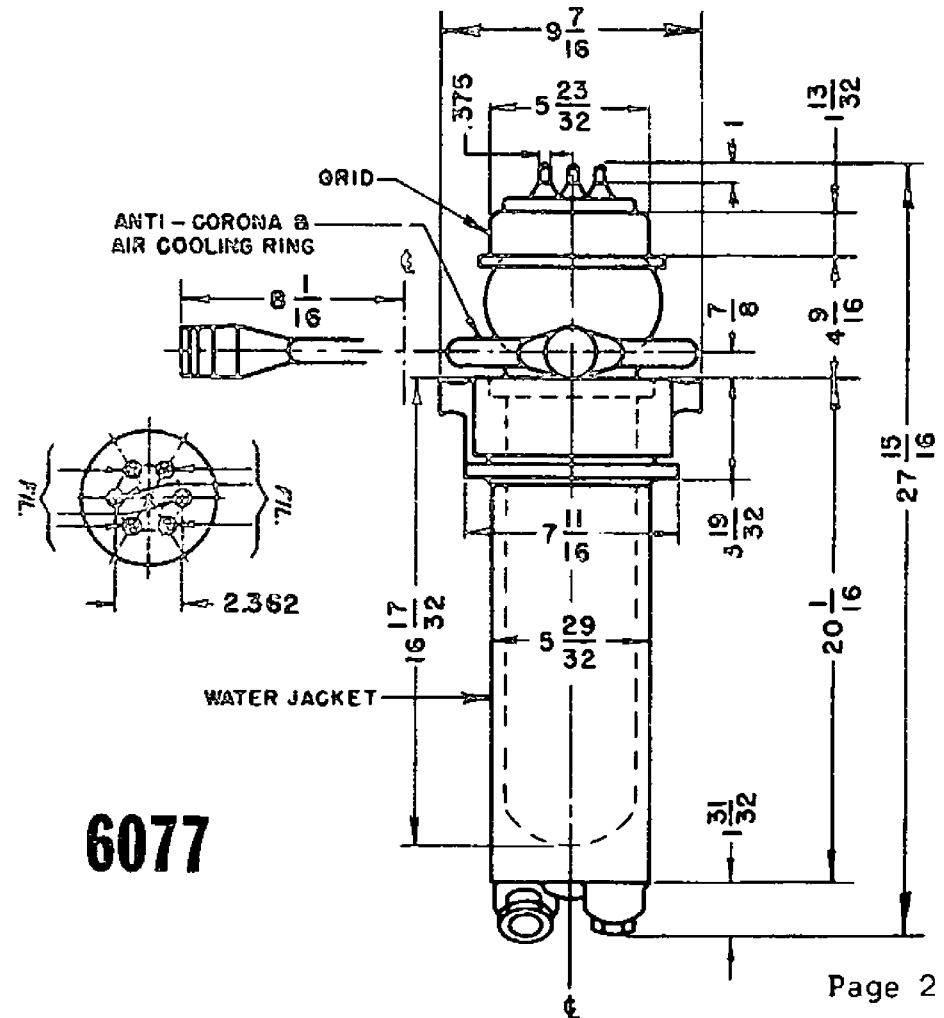
Maximum ratings apply up to 15 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced according to the tabulation below (other maximum ratings are the same as shown above). Special attention should be given to adequate ventilation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

At frequencies up to 4 megacycles the plate voltage and input in Class C telephony and in 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 Telephony	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 Telephony	100	87	47 per cent

### Characteristic Range Values for Equipment Design

Characteristic Conditions	Limits		
	Mc.	Range	Max.
Grid Voltage	E <sub>b</sub> =1.5 kilovolts I <sub>b</sub> =70 amperes	E <sub>c</sub> — — I <sub>c</sub> — —	980 volts
Grid Current	E <sub>b</sub> =2.5 kilovolts I <sub>b</sub> =70 amperes	I <sub>c</sub> — —	25 amperes
Plate Voltage	E <sub>c</sub> =0 volts I <sub>b</sub> =5 amperes	E <sub>b</sub> : 2.8 3.1 3.6 kilovolts	
Grid Voltage	E <sub>b</sub> =12 kilovolts I <sub>b</sub> =4.8 amperes	E <sub>c</sub> : -280 -330 -375 volts	
Plate Power Output	E <sub>b</sub> =12 kilovolts E <sub>c</sub> =-1000 volts I <sub>b</sub> =12 amperes I <sub>c</sub> =1.25 amperes f=15 megacycles	P <sub>o</sub> : 100 — —	— kilowatts
Plate Power Output	E <sub>b</sub> =10 kilovolts E <sub>c</sub> =-800 volts I <sub>b</sub> =6.7 amperes I <sub>c</sub> =1.4 amperes f=50 megacycles	P <sub>o</sub> : 45 — —	— kilowatts
Plate Current	E <sub>b</sub> =12 kilovolts E <sub>c</sub> =-500 volts	I <sub>b</sub> : — —	0.25 amperes



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