

FEDERAL POWER TRIODE

Type F-5604

10 Kilowatts Plate Dissipation



GENERAL DATA

DESCRIPTION:

Federal's Type F-5604 is a three-electrode tube designed for use as a radio-frequency amplifier, oscillator, or Class B modulator. It is ruggedly constructed to meet the severe conditions of radio-frequency heating service. The heavy wall anode is forced-air cooled, capable of dissipating 10 kilowatts. The cathode is a pure tungsten filament. Maximum ratings apply up to 22.5 megacycles. Operation at 45 megacycles is permissible with plate voltage and input reduced to one-half maximum ratings.

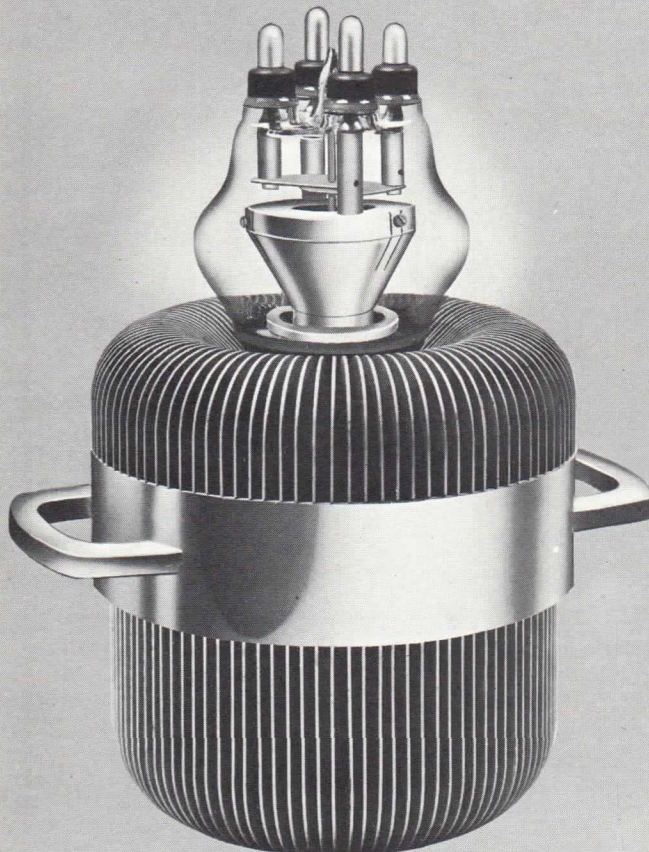
Electrical:

▶ Filament Voltage	11.0 Volts
▶ Filament Current	176 Amperes
▶ Filament Starting Current	270 Amperes max.
▶ Peak Cathode Current	12.4 Amperes
▶ Filament Cold Resistance	.0052 Ohms
▶ Amplification Factor,	
$I_b = 1.25$ Amp.; $E_c = -100$ Volts	19.5
▶ Interelectrode Capacitances	
Grid-Plate	25 μmf
Grid-Filament	30 μmf
Plate-Filament	1.25 μmf

Mechanical:

▶ Mounting Position—	
Vertical, Anode Down	
▶ Type of Cooling—Forced Air	
Maximum Incoming	
Air Temperature	45° C
▶ Required Air Flow on Anode	
Plate Dissipation—	
Kilowatts	10 8 6
Air Flow—CFM	750 525 350
Static Pressure—	
Inches Water	2 1 0.45
Maximum Anode	
Temperature	230° C
▶ Required Air Flow on	
Bulb*	50 CFM
Maximum Glass	
Temperature	160° C
▶ Net Weight, approx.	45 Pounds

*Operation at frequencies above 15 Mc/sec. may require air-flow on the dish center in order to hold the temperature of the seals and dish below 160° C. This flow may be obtained by deflection of the anode cooling air, or by means of a separate blower supplying 50 C.F.M. through a 3" nozzle.



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Federal tubes have always been known for their *plus values*: an extra rugged construction, a longer life of service.

Maximum Ratings and Typical Operating Conditions

AUDIO-FREQUENCY POWER AMPLIFIER AND MODULATOR—CLASS B

Maximum Ratings

DC Plate Voltage	12,500 Volts
Max. Signal DC Plate Current**	2.75 Amperes
Max. Signal Plate Input**	32.5 Kilowatts
Plate Dissipation**	10 Kilowatts

Typical Operation

(Unless otherwise specified, values are for 2 tubes)

D C Plate Voltage	12,000 Volts
DC Grid Voltage	—600 Volts
Peak A-F Grid to Grid Voltage	2,380 Volts
Zero Signal DC Plate Current	0.6 Amperes
Maximum Signal DC Plate Current	4.5 Amperes
Effective Load Resistance (plate to plate)	5,900 Ohms
Maximum Signal Driving Power, approx.	160 Watts
Maximum Signal Power Output, approx.	36 Kilowatts

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

RADIO-FREQUENCY POWER AMPLIFIER —CLASS B TELEPHONY

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

Maximum Ratings

DC Plate Voltage	12,500 Volts
DC Plate Current	1.4 Amperes
Plate Input	16 Kilowatts
Plate Dissipation	10 Kilowatts

Typical Operation

DC Plate Voltage	10,000 Volts
DC Grid Voltage	—500 Volts
Peak R-F Grid Voltage	490 Volts
DC Plate Current	0.8 Ampere
Driving Power, approx.†	70 Watts
Power Output, approx.	2.8 Kilowatts

†At crest of a-f cycle with modulation factor of 1.0.

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

DC Plate Voltage	10,500 Volts
DC Grid Voltage	—2,000 Volts
DC Plate Current	1.5 Amperes
DC Grid Current	0.45 Ampere
Plate Input	15 Kilowatts
Plate Dissipation	6.6 Kilowatts

Typical Operation

DC Plate Voltage	10,000 Volts
DC Grid Voltage	—1,300 Volts
Peak R-F Grid Voltage	1,930 Volts
DC Plate Current	1.4 Amperes
DC Grid Current, approx.	0.15 Ampere
Driving Power, approx.	280 Watts
Power Output, approx.	11.9 Kilowatts

RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR—CLASS C TELEGRAPHY

Key-down conditions per tube without amplitude modulation¶

Maximum Ratings, Absolute Values

DC Plate Voltage	12,500 Volts
DC Grid Voltage	—2,000 Volts
DC Plate Current	3 Amperes
DC Grid Current	0.45 Ampere
Plate Input	32.5 Kilowatts
Plate Dissipation	10 Kilowatts

Typical Operation

DC Plate Voltage	8,000	10,000	12,000 Volts
Filament Voltage	10.5	10.7	10.9 Volts
DC Grid Voltage	—680	—870	—1,170 Volts
Peak R-F Grid Voltage	1,300	1,620	2,130 Volts
DC Plate Current	1.5	2.0	2.5 Amperes
DC Grid Current, approx.	.19	.20	.22 Ampere
Driving Power, approx.	250	320	470 Watts
Power Output, approx.	9.2	15	22.5 Kilowatts

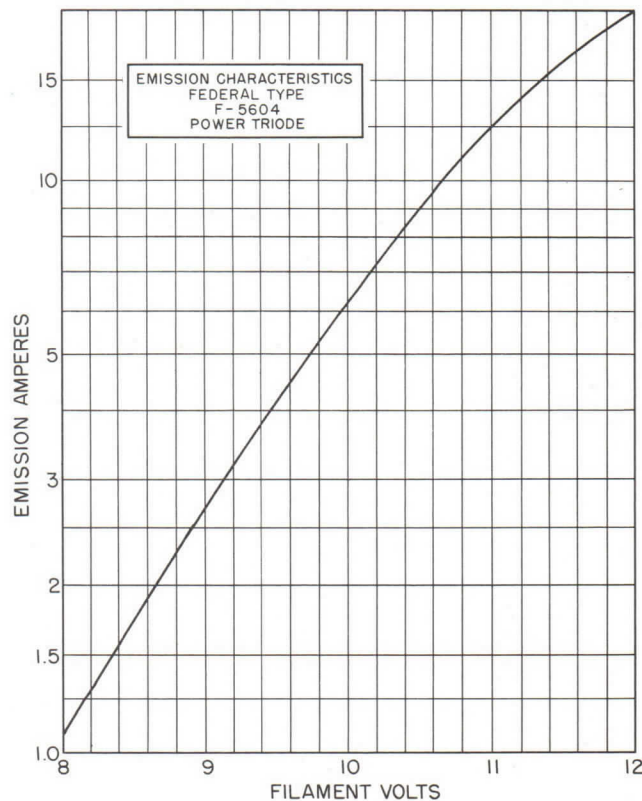
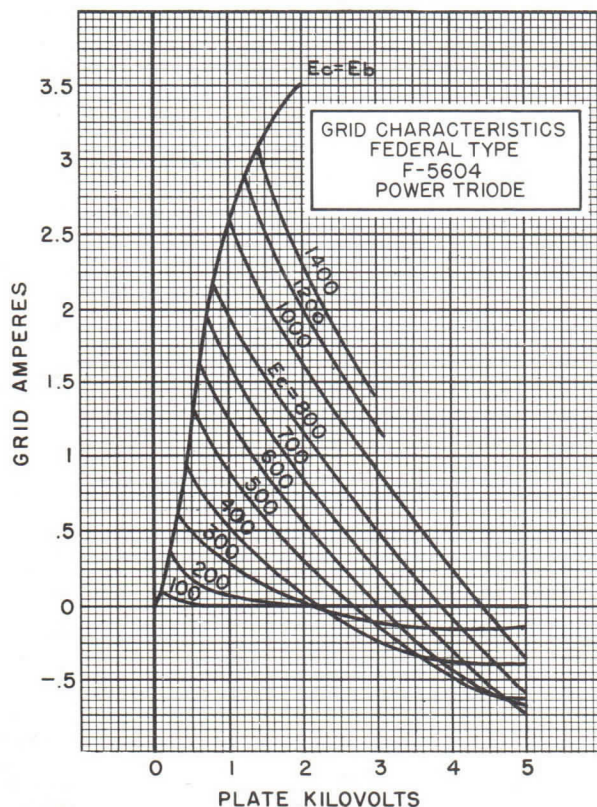
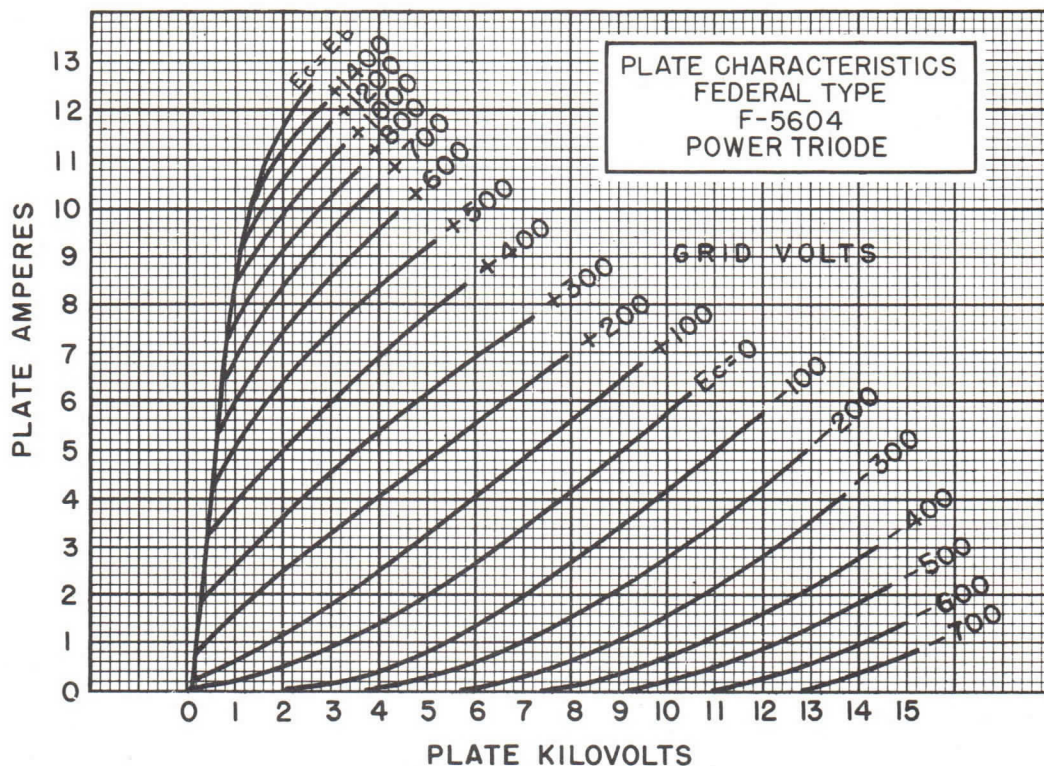
¶Modulation essentially negative; may be used if positive peak of the envelope does not exceed 115 percent of carrier conditions.

Federal's name on a tube signifies the best in design, engineering, materials, components and craftsmanship.

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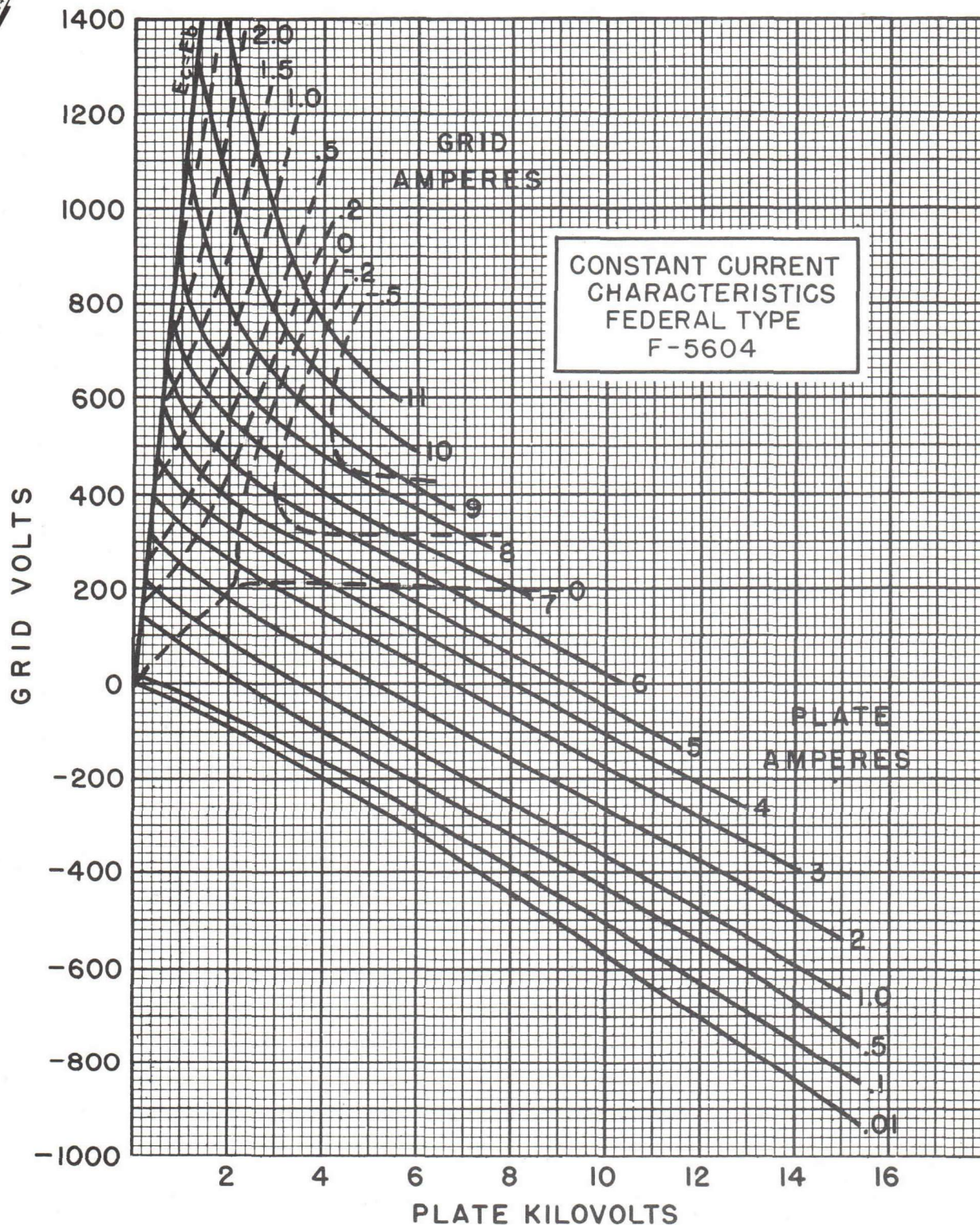


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One reason why Federal tubes are trade-marked, is to show the craftsman's pride and Federal's satisfaction in work well done.

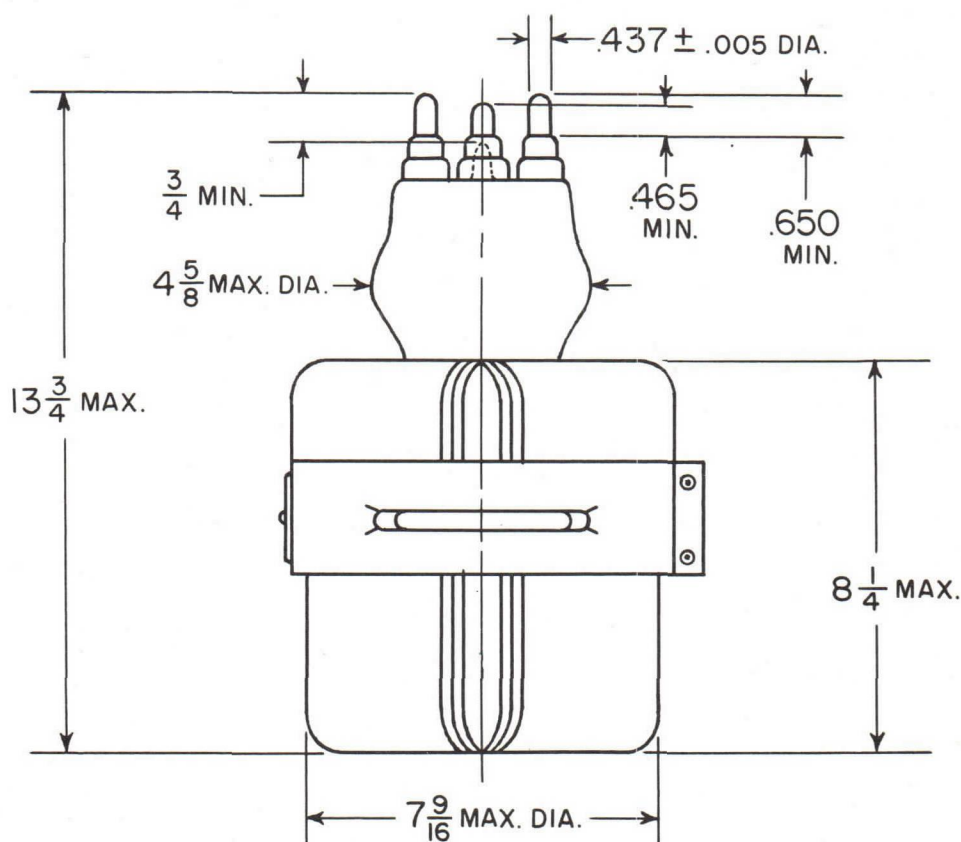
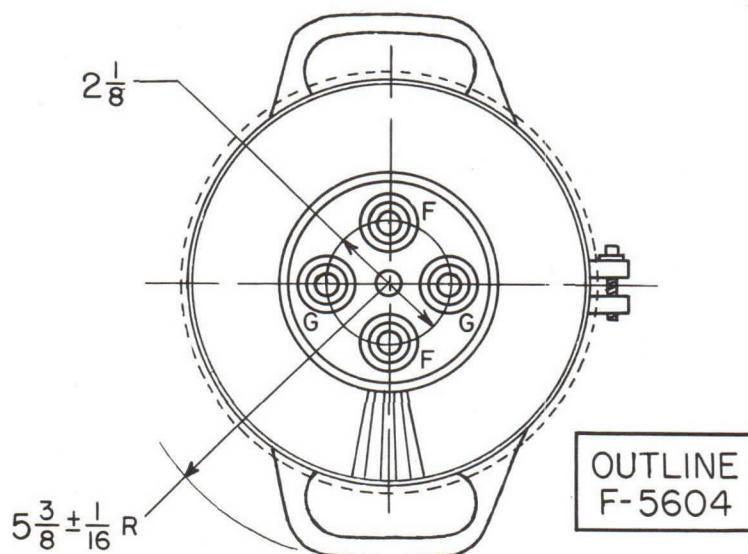


That Federal tubes, by their performance, largely sell themselves, is a tribute to the product and to the manufacturer.

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**Federal Always Has
Made Better Tubes**