



ELECTRON TUBE DEPARTMENT ■ COMPONENTS DIVISION
INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION, CLIFTON, NEW JERSEY

F-6696
F-6697
POWER
TRIODES

DESCRIPTION

The F-6696 and F-6697 are three electrode tubes designed for use as radio frequency amplifiers, oscillators or Class B modulators. The rugged coaxial stem structure provides high dissipation, low inductance r-f electrode terminals. The cathode is a thoriated tungsten filament.

The F-6696 has a water cooled, heavy wall anode capable of 60 kw dissipation. The F-6697 has a forced-air cooled copper anode-radiator assembly of brazed construction capable of 35 kw dissipation.

ELECTRICAL

Filament Voltage	13	volts
Filament Current	205	amperes
Filament Starting Current	800	amperes
Filament Cold Resistance	.0073	ohms
Amplification Factor	20	
Inter-Electrode Capacitances		
Grid-Plate	55	μuf
Grid-Filament	76	μuf
Plate-Filament	2.7	μuf

MECHANICAL

Mounting Position	Vertical, Anode down						
Max. Glass & Seal Temperature *	180° C						
	F-6696			F-6697			
Plate Dissipation	60	45	30	35	25	15	kilowatts
Water Flow	18	13	8	-	-	-	gpm
Water Jacket Pressure Drop	7	4	2	-	-	-	psi
Air Flow **	-	-	-	1700	1000	440	cfm
Static Air Pressure	-	-	-	8.0	2.8	.6	inches of water
Net Weight, approx.	17			37			lbs

* At the upper frequencies, special attention should be given to provide adequate cooling to the seals to limit the temperature to 180°C max.; up to 150 cfm air flow may be required.

** Maximum incoming air temperature of 50°C at sea level.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

Audio-Frequency Power Amplifier and Modulator - Class B

Maximum Ratings, Absolute Values

D-C Plate Voltage		16,000	volts
Max. Signal D-C Plate Current ²		11	amperes
Max. Signal Plate Input ²			
F-6696		120	kilowatts
F-6697		110	kilowatts
Plate Dissipation ²			
F-6696		60	kilowatts
F-6697		35	kilowatts

Typical Operation

(Unless otherwise specified, values are for two tubes)

		F-6696	
D-C Plate Voltage	10,000	12,000	volts
D-C Grid Voltage	-450	-600	volts
Peak A-F Grid-to-Grid Voltage	1,750	2,120	volts
Peak A-F Plate-to-Plate Voltage	16,000	19,200	volts
Zero Signal D-C Plate Current	3.0	2.0	amperes
Max. Signal D-C Plate Current	17.4	20.0	amperes
Effective Load Resistance, Plate-to-Plate	1,170	1,230	ohms
Max. Signal Driving Power, approx.	550	600	watts
Max. Signal Power Output, approx.	110	152	kilowatts

² Averaged over any audio frequency cycle of sine-wave form

Radio-Frequency Power Amplifier - Class B

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

Maximum Ratings, Absolute Values

D-C Plate Voltage		16,000	volts
D-C Plate Current		9.0	amperes
Plate Input			
F-6696		90	kilowatts
F-6697		55	kilowatts
Plate Dissipation			
F-6696		60	kilowatts
F-6697		35	kilowatts

Typical Operation

F-6696

D-C Plate Voltage	12,000	12,000	volts
D-C Grid Voltage	-550	-550	volts
Peak R-F Grid Voltage	510	640	volts
D-C Plate Current	4.3	6.8	amperes
Peak R-F Plate Voltage	5,300	5,300	volts
D-C Grid Current	0	0	milliamperes
R-F Load Resistance	780	500	ohms
Driving Power, approx. †	450	1,500	watts
Power Output, approx.	18	28	kilowatts

† At crest of audio-frequency cycle
with modulation factor of 1.0



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Plate-Modulated Radio-Frequency Power Amplifier - Class C Telephony
(Carrier conditions per tube for use with a max. modulation factor of 1.0)

Maximum Ratings, Absolute Values

D-C Plate Voltage		10,000	volts
D-C Grid Voltage		-3,200	volts
D-C Plate Current		8.5	amperes
D-C Grid Current		2.0	amperes
Plate Input		81	kilowatts
Plate Dissipation			
F-6696		40	kilowatts
F-6697		23	kilowatts

Typical Operation

D-C Plate Voltage		9,500	volts
D-C Grid Voltage		-1,600	volts
Peak R-F Grid Voltage		2,300	volts
Peak R-F Plate Voltage		7,800	volts
D-C Plate Current		8.4	amperes
D-C Grid Current		0.90	amperes
R-F Load Resistance		510	ohms
Driving Power, approx.		2.0	kilowatts
Power Output, approx.		60	kilowatts

Radio-Frequency Power Amplifier and Oscillator - Class C Telegraphy
(Key down conditions per tube without amplitude modulation) ***

Maximum Ratings, Absolute Values

D-C Plate Voltage		16,000	volts
D-C Grid Voltage		-3,200	volts
D-C Plate Current		11	amperes
D-C Grid Current		2.0	amperes
Plate Input		120	kilowatts
Plate Dissipation			
F-6696		60	kilowatts
F-6697		35	kilowatts

Typical Operation

D-C Plate Voltage	10,000	15,000	volts
D-C Grid Voltage	-1,200	-1,600	volts
Peak R-F Grid Voltage	1,900	2,120	volts
Peak R-F Plate Voltage	8,000	12,500	volts
D-C Plate Current	10	7.0	amperes
D-C Grid Current, approx.	0.81	0.30	amperes
R-F Load Resistance	440	970	ohms
Driving Power, approx.	1.5	0.60	kilowatts
Power Output, approx.	72	80	kilowatts

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

MAXIMUM FREQUENCY RATINGS

Maximum ratings apply up to 30 mc except as noted. 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.

Frequency	30	50	70	megacycles
Max. Rated Plate Voltage				
and Plate Input: Class B	100	80	55	per cent
Class C	100	75	50	per cent

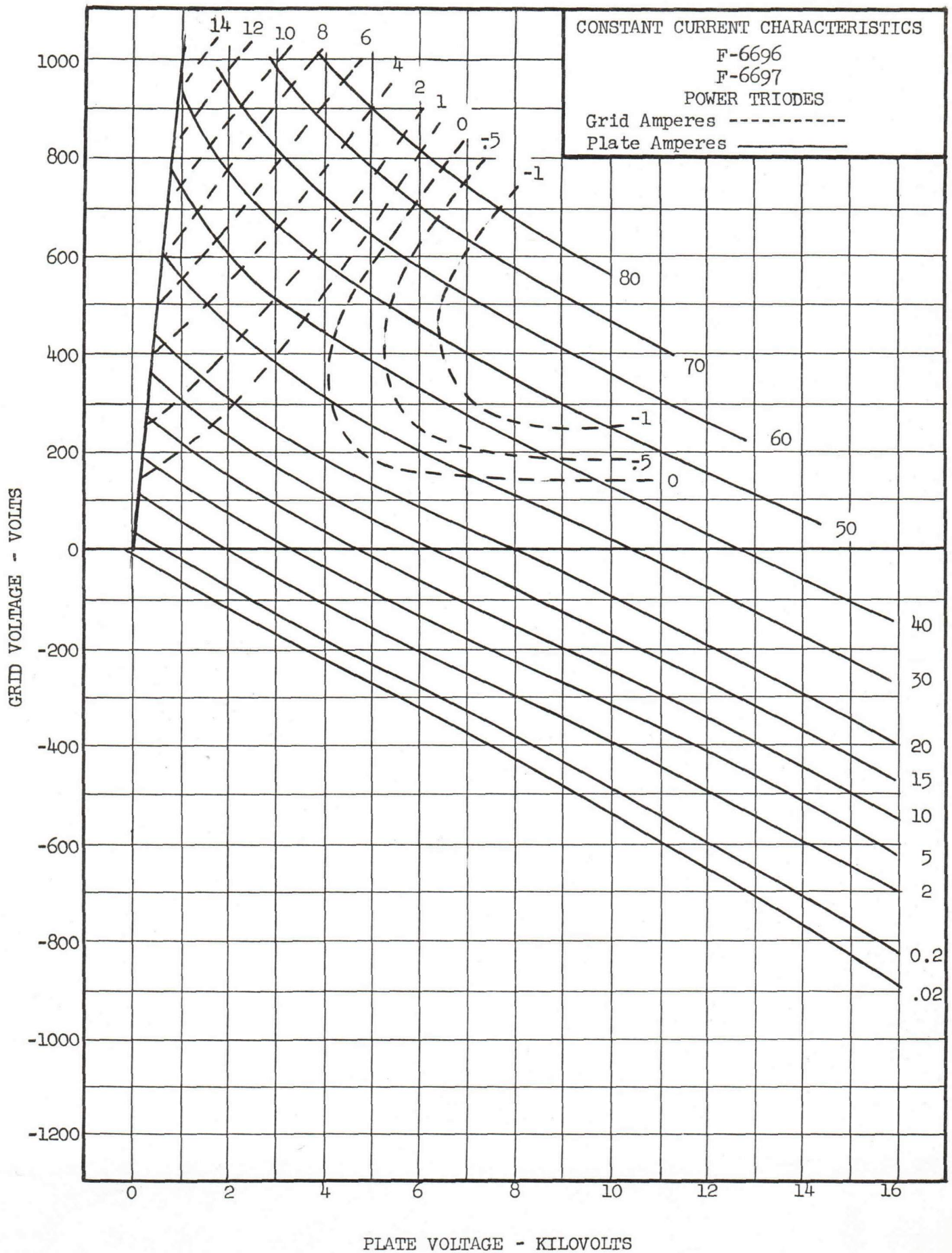
CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

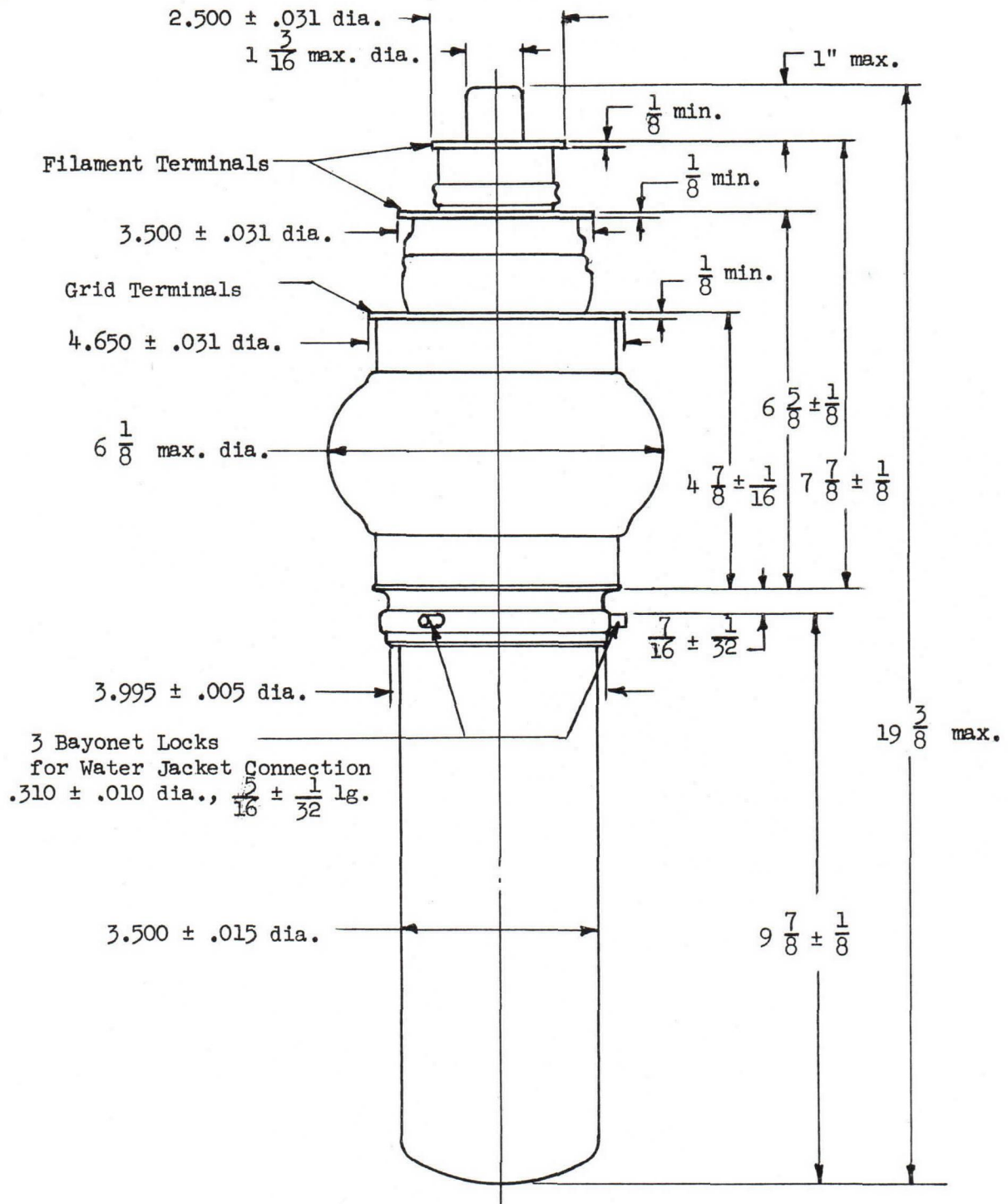
<u>Characteristics</u>	<u>Conditions</u>	<u>L i m i t s</u>		
		<u>Min.</u>	<u>Bogey</u>	<u>Max.</u>
Grid Voltage	$e_b = 1500$ volts; $i_b = 48$ amps.	$e_c:$ -	-	1000 volts
Grid Current	$e_b = 1500$ volts; $i_b = 48$ amps.	$i_c:$ -	-	15 amps
Plate Voltage	$E_c = 0$ V d-c; $I_b = 3.0$ A d-c	$E_b:$ 1.9	2.4	2.9 Kv d-c
Plate Voltage	$E_c = -200$ V d-c; $I_b = 3.0$ A d-c	$E_b:$ 5.6	6.4	7.2 Kv d-c
Grid Voltage	$E_b = 15.0$ Kv d-c; $I_b = 0.020$ A d-c	$E_c:$ -700	-820	-940 V d-c
Plate Power Output	$E_b = 15.0$ Kv d-c; $I_b = 7.0$ A d-c; $E_c = -1600$ V d-c; $I_c = 0.30$ A d-c	$P_o:$ 68	-	- Kw

Additional information for specific applications can be obtained from the:

ITT Components Division
Electron Tube Applications Section
P. O. Box 412
Clifton, New Jersey

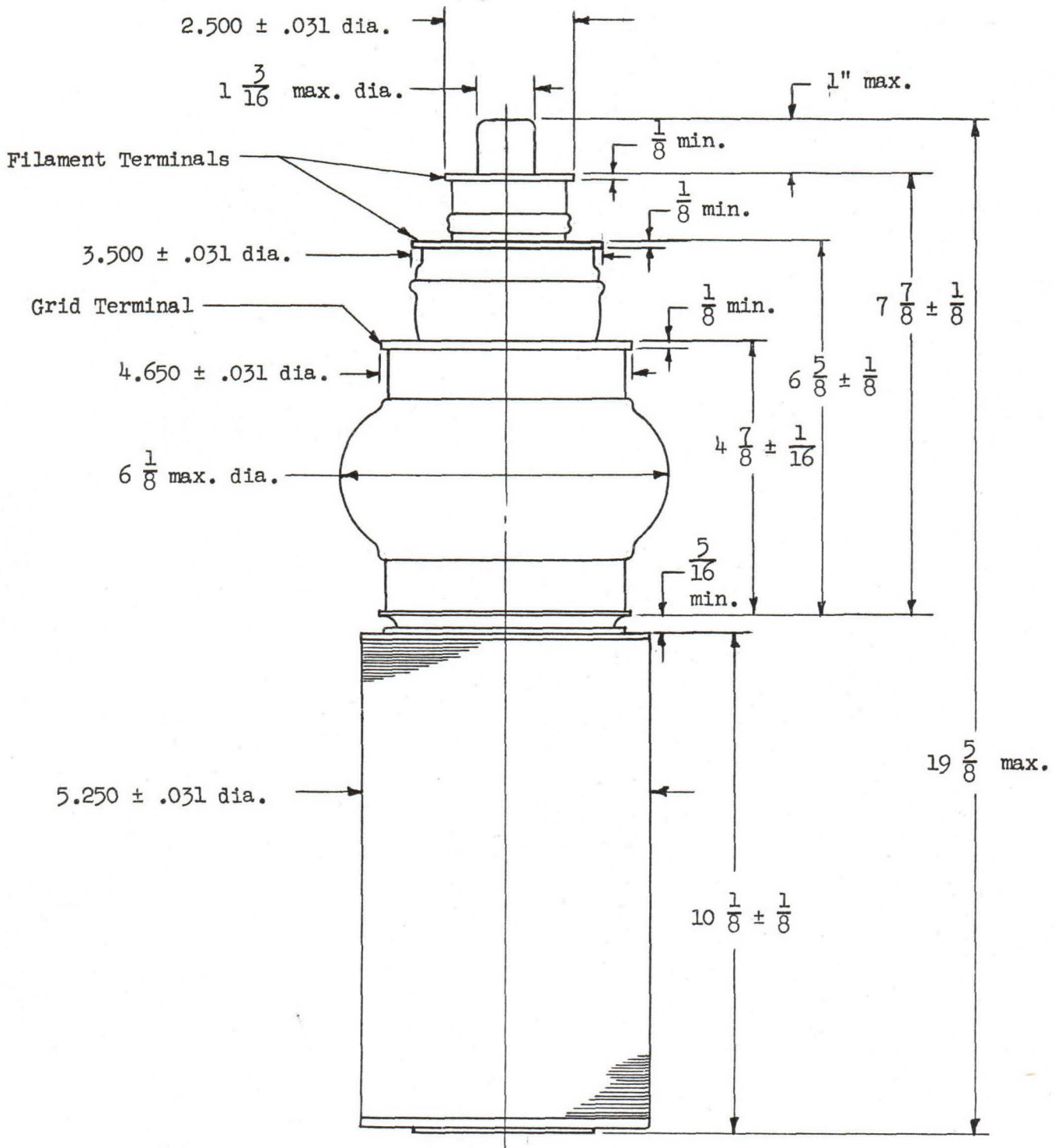






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