



Tentative Specification

DESCRIPTION

The F-8146 and F-8147 are general purpose metal and ceramic triodes for use as amplifiers, oscillators or Class B modulators under CW or pulsed conditions. The F-8146 has a water-cooled anode capable of dissipating 40 kilowatts. The F-8147 has a forced air-cooled, copper anode-radiator assembly of brazed construction capable of 20 kilowatts.

ELECTRICAL

| | | |
|--------------------------------------|------|---------------|
| Filament Voltage | 11 | volts |
| Filament Current | 155 | amperes |
| Filament Starting Current | 500 | amperes |
| Filament Cold Resistance | .008 | ohms |
| Amplification Factor | | |
| $E_c = -50$ volts; $I_b = 3$ amperes | 17 | |
| Direct Inter-Electrode Capacitance | | |
| Grid-Plate | 53 | μf |
| Grid-Filament | 58 | μf |
| Plate-Filament | 3.0 | μf |

MECHANICAL

Mounting Position Vertical, anode up or down
Ceramic and Seal Temperature, max. 250° C
(see Notes 1 and 2)

| | F-8146 | | F-8147 | | | |
|----------------------------|--------|----|--------|-----|-----|-----------------|
| Plate Dissipation | 40 | 30 | 20 | 15 | 10 | kilowatts |
| Water Flow | 20 | 15 | 10 | - | - | gpm |
| Water Jacket Pressure Drop | 18 | 10 | 5 | - | - | psi |
| Air Flow (Note 3) | - | - | 1000 | 600 | 300 | cfm |
| Static Air Pressure | - | - | 8 | 3 | 1 | inches of water |
| Net Weight, approx. | 8.5 | - | - | 22 | - | lbs. |

Note 1: Auxiliary air flow of up to 120 cfm may be required to limit the ceramic and seal temperature to less than the 250°C max.

Note 2: A temperature sensitive lacquer manufactured by the Tempil Corporation, 132 W. 22nd St., New York 11, N. Y. is convenient for this measurement.

Note 3: Maximum incoming air temperature, 45°C.

* Formerly our D-1030A & B.

F-8146
 F-8147
 POWER
 TRIODES

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS
 (Values apply to both tubes unless otherwise specified)

Audio-Frequency Power Amplifier and Modulator - Class B

Maximum Ratings, Absolute Values

| | | | |
|-------------------------------------|--------|--------|-----------|
| D-C Plate Voltage | | 11,000 | volts |
| Maximum Signal D-C Plate Current ** | | 8 | amperes |
| Maximum Signal Plate Input ** | | | |
| | F-8146 | 80 | kilowatts |
| | F-8147 | 60 | kilowatts |
| Plate Dissipation ** | | | |
| | F-8146 | 40 | kilowatts |
| | F-8147 | 20 | kilowatts |

Typical Operation

(Unless otherwise specified, values are for two tubes)

| | <u>F-8146</u> | <u>F-8146</u> | |
|---|---------------|---------------|-----------|
| D-C Plate Voltage | 10,500 | 8,500 | volts |
| D-C Grid Voltage | -600 | -520 | volts |
| Peak A-F Grid-to-Grid Voltage | 1,800 | 1,740 | volts |
| Peak A-F Plate-to-Plate Voltage | 16,000 | 14,000 | volts |
| Zero Signal D-C Plate Current | 1.8 | 1.2 | amperes |
| Maximum Signal D-C Plate Current | 15.2 | 12.8 | amperes |
| Effective Load Resistance, Plate-to-Plate | 1,330 | 1,400 | ohms |
| Maximum Signal Driving Power, approx. | 50 | 110 | watts |
| Maximum Signal Power Output, approx. | 95 | 70 | kilowatts |

Radio-Frequency Power Amplifier - Class B

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

Maximum Ratings, Absolute Values

| | | | |
|-------------------|--------|--------|-----------|
| D-C Plate Voltage | | 11,000 | volts |
| D-C Plate Current | | 6 | amperes |
| Plate Input | | | |
| | F-8146 | 60 | kilowatts |
| | F-8147 | 30 | kilowatts |
| Plate Dissipation | | | |
| | F-8146 | 40 | kilowatts |
| | F-8147 | 20 | kilowatts |

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

Typical Operation

| | <u>F-8146</u> | <u>F-8146</u> | |
|---------------------------|---------------|---------------|-----------|
| D-C Plate Voltage | 10,500 | 8,500 | volts |
| D-C Grid Voltage | -550 | -460 | volts |
| Peak R-F Grid Voltage | 600 | 520 | volts |
| Peak R-F Plate Voltage | 4,000 | 3,500 | volts |
| D-C Plate Current | 4.5 | 5.7 | amperes |
| D-C Grid Current | 0 | 0 | amperes |
| R-F Load Resistance | 550 | 380 | ohms |
| Driving Power, approx. ++ | 200 | 575 | watts |
| Power Output, approx. | 14.5 | 16 | 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

| | | | |
|-------------------|------------------|--------|-----------|
| D-C Plate Voltage | | 8,500 | volts |
| D-C Grid Voltage | | -2,000 | volts |
| D-C Plate Current | | 6 | amperes |
| D-C Grid Current | | .8 | amperes |
| Plate Input | | 55 | kilowatts |
| Plate Dissipation | F-8146 | 26 | kilowatts |
| | F-8147 | 13 | kilowatts |

Typical Operation

| | | | |
|------------------------|--|--------|-----------|
| D-C Plate Voltage | | 8,000 | volts |
| D-C Grid Voltage | | -1,400 | volts |
| Peak R-F Grid Voltage | | 2,120 | volts |
| Peak R-F Plate Voltage | | 7,000 | volts |
| D-C Plate Current | | 5.6 | amperes |
| D-C Grid Current | | .6 | amperes |
| R-F Load Resistance | | 680 | ohms |
| Driving Power, approx. | | 1,250 | watts |
| Power Output, approx. | | 36 | kilowatts |

++ At crest of audio frequency cycle
with modulation factor of 1.0



F-8146
 F-8147
 POWER
 TRIODES

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 | | 11,000 | volts |
| D-C Grid Voltage | | -2,000 | volts |
| D-C Plate Current | | 8 | amperes |
| D-C Grid Current | | .8 | amperes |
| Plate Input | | 80 | kilowatts |
| Plate Dissipation | F-8146 | 40 | kilowatts |
| | F-8147 | 20 | kilowatts |

Typical Operation

| | <u>Cathode Drive</u> | <u>Grid Drive</u> | | | |
|------------------------|----------------------|-------------------|--------|-------|-----------|
| D-C Plate Voltage | 7,500 | 10,500 | 9,500 | 7,500 | volts |
| D-C Grid Voltage | -800 | -1,500 | -1,200 | -800 | volts |
| Peak R-F Grid Voltage | 1,300 | 2,050 | 1,750 | 1,300 | volts |
| Peak R-F Plate Voltage | 6,000 | 9,000 | 8,000 | 6,000 | volts |
| D-C Plate Current | 7.5 | 6.7 | 7.8 | 7.5 | amperes |
| D-C Grid Current | .45 | .40 | .45 | .45 | amperes |
| R-F Load Resistance | 460 | 735 | 570 | 460 | ohms |
| Driving Power, approx. | 9,000 | 770 | 760 | 545 | watts |
| Power Output, approx. | 47 | 55 | 55 | 38 | kilowatts |

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

RATINGS VERSUS FREQUENCY

Maximum ratings apply up to 50 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 above). Special attention should be given to adequate ventilation of the ceramics and seals at these frequencies.

| | | | |
|---|-----|-----|------------|
| Frequency | 50 | 110 | megacycles |
| Percentage of Maximum Rated Plate Voltage and Plate Input | 100 | 70 | per cent |

PULSE SERVICE OPERATIONS

In pulse r-f amplifier service, it is possible to operate the tube under conditions not permissible in CW operation. Because of the wide variety of operating conditions, it is advisable that tube operation recommendations be obtained from our Engineering Department for specific conditions.

MODULATOR TUBE - PULSED OPERATION

Maximum Ratings, Absolute Values

| | | |
|------------------------------------|-------|-----------|
| D-C Plate Voltage | 18 | kilovolts |
| Peak Plate Voltage (instantaneous) | 20 | kilovolts |
| D-C Grid Voltage | -2500 | volts |
| Peak Positive Grid Voltage | 4000 | volts |
| Pulse Cathode Current | 220 | amperes |
| Grid Dissipation | 800 | watts |
| Pulse Length | 2000 | μsec. |

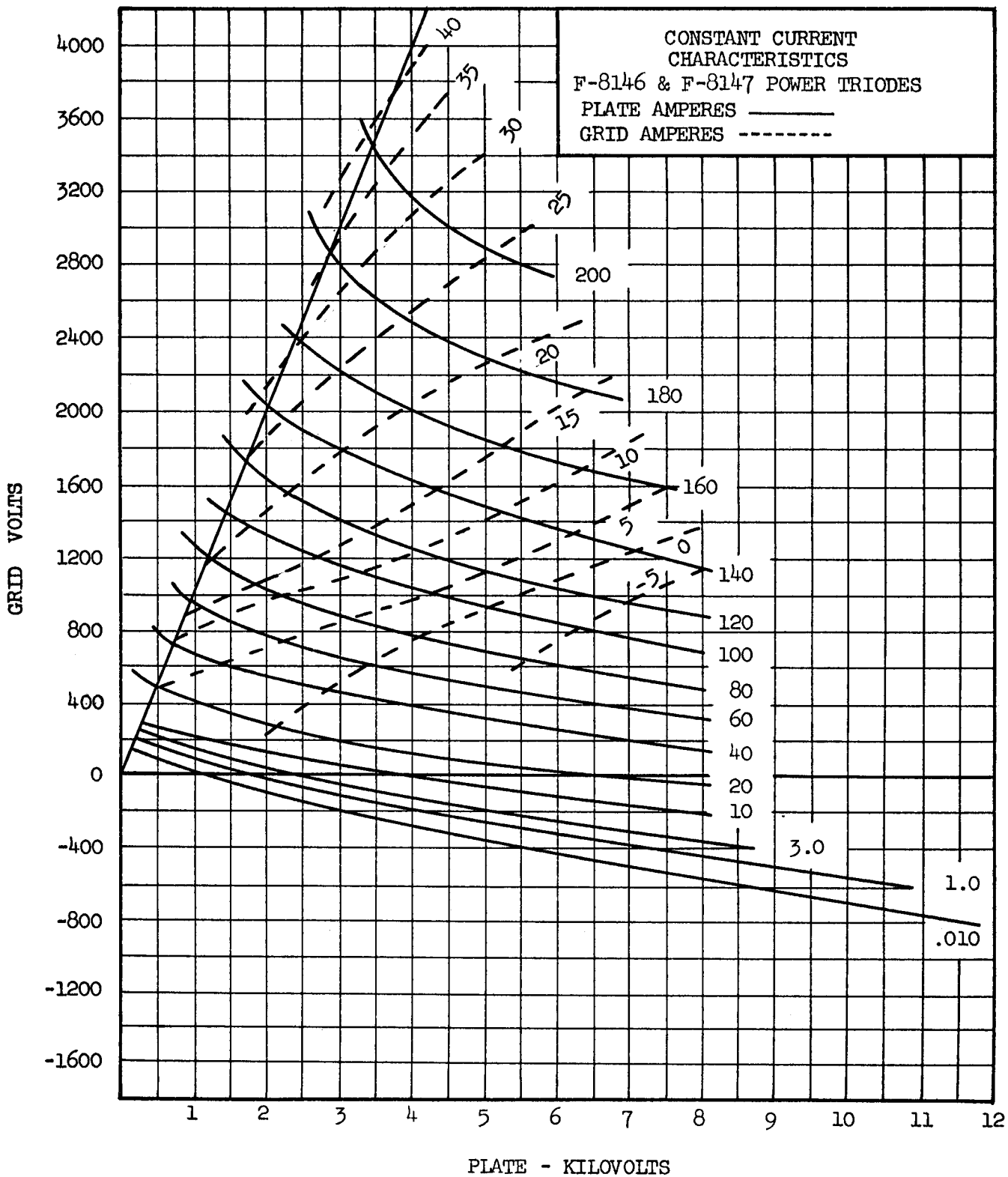
Typical Operation

| | | |
|-----------------------------|-------|-----------|
| D-C Plate Voltage | 16 | kilovolts |
| Pulse Plate Current | 120 | amperes |
| D-C Grid Voltage | -1500 | volts |
| Pulse Grid Current | 40 | amperes |
| Pulse Positive Grid Voltage | 2200 | volts |
| Duty Factor | .003 | |
| Pulse Length | 10 | μsec. |
| Plate Output Voltage | 13.5 | kilovolts |
| Pulse Output Power | 1.6 | mw |

Additional information for specific applications can be obtained from the:

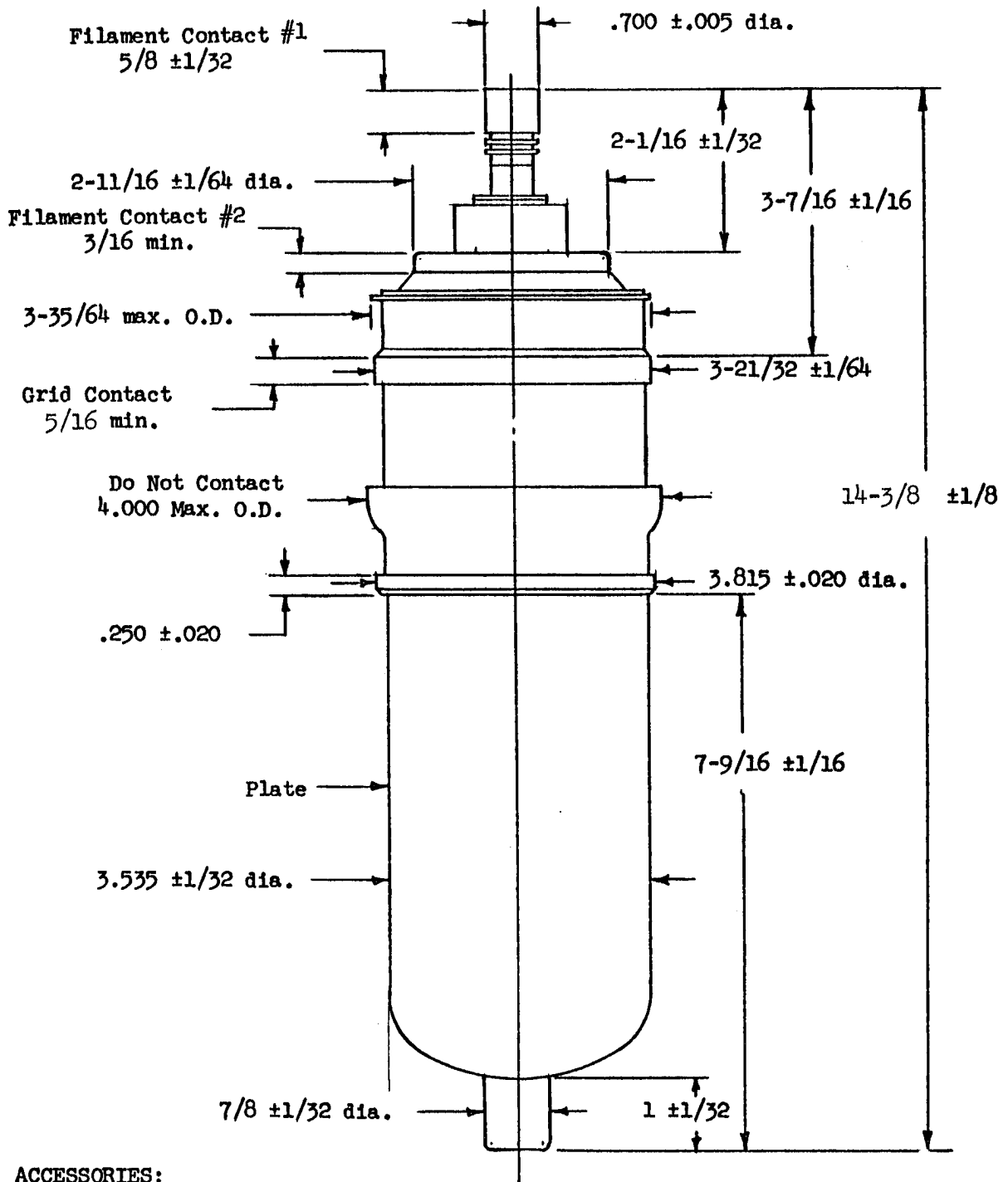
Electron Tube Applications Section
ITT Components Division
P.O. Box 412
Clifton, New Jersey





NOTE: Contact areas are to be concentric within .025".

OUTLINE
F-8146 POWER TRIODE



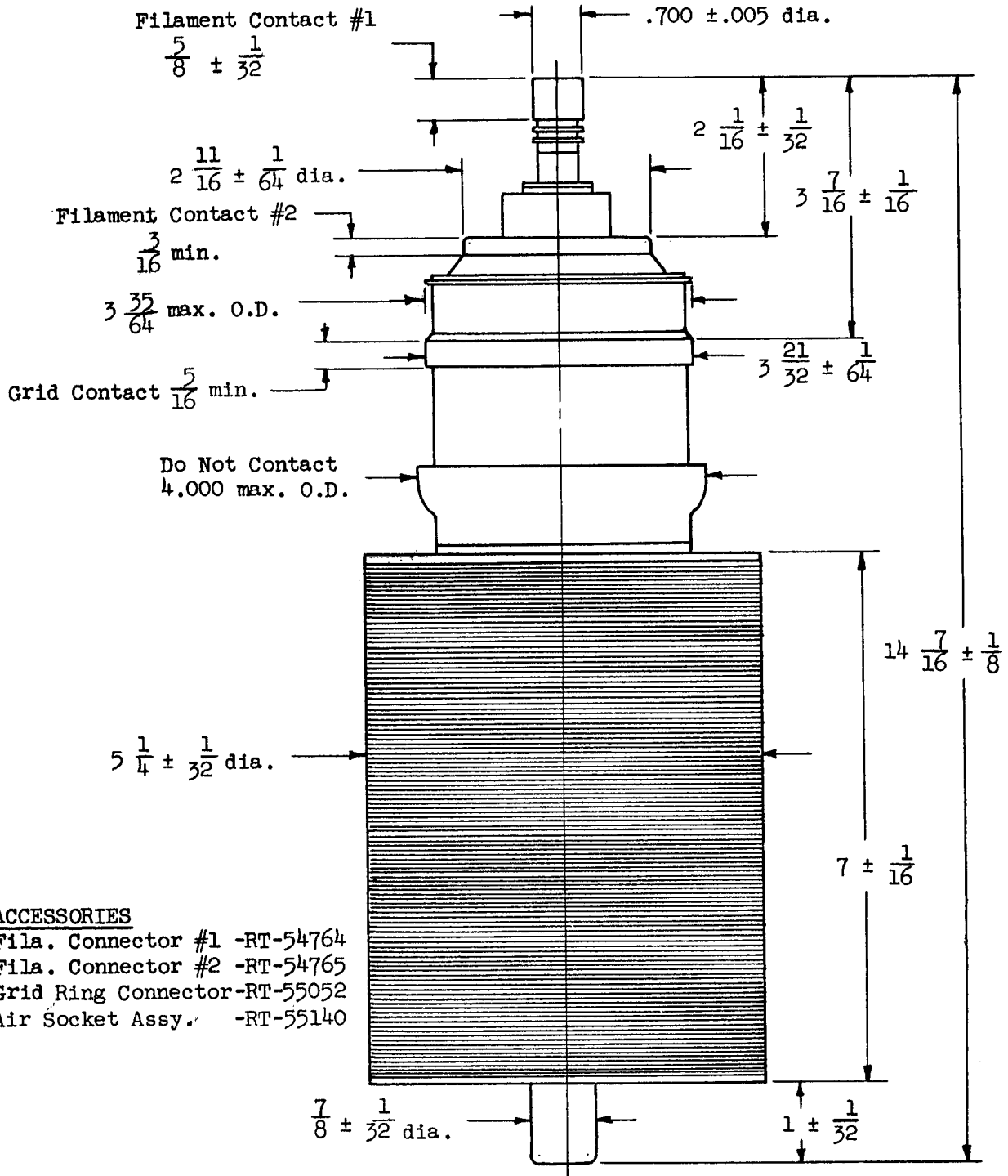
ACCESSORIES:

Filament Connector #1 - RT-54764
Filament Connector #2 - RT-54765

Grid Connector - RT-54763
Water Jacket - RT-55070



NOTE: Contact areas are to be concentric within .025"



ACCESSORIES

- Fila. Connector #1 -RT-54764
- Fila. Connector #2 -RT-54765
- Grid Ring Connector -RT-55052
- Air Socket Assy. -RT-55140

OUTLINE
F-8147 POWER TRIODE