



ELECTRONIC TUBE REFERENCE

152TL

Power - Triode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

TRIODE

Low-mu power triode for audio-frequency and radio-frequency amplification, oscillator operation, and modulator service in transmitting equipment.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	4
NOMINAL HEATER	10 V / 6.25 A	PARALLEL HEATER	5 V / 12.5 A
HEATING	Direct	SERIES OPERATION	Capable
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Triode	
TRANSCONDUCTANCE	0.00715 S
AMPLIFICATION FACTOR	12
MAXIMUM PLATE VOLTAGE	3000 V
MAXIMUM PLATE DISSIPATION	150 W
<i>Published Class-B/Class-C maximum ratings and characteristics promoted.</i>	

152TL — Low-Mu Power Triode

The **152TL** is a low-mu power triode designed for use as a modulator, oscillator, and power amplifier. Manufactured by Eitel-McCullough, Inc. (and later under Varian), this transmitting tube is characterized by its high power capabilities, flexible filament configuration, and external grid and plate connections.

Mechanical Design and Filament Configuration

The 152TL features a unique mechanical construction designed to handle high voltages and thermal dissipation. The tube utilizes a thoriated tungsten filament that can be operated in two different electrical configurations depending on how the base pins are wired:

- **Low-Voltage / High-Current Configuration:** 5.0 V at 12.5 A
- **High-Voltage / Low-Current Configuration:** 10.0 V at 6.25 A

This dual-option design yields a constant calculated filament power of 62.5 W (calculated as 5.0 V multiplied by 12.5 A, or 10.0 V multiplied by 6.25 A).

The physical dimensions and mechanical specifications of the tube are as follows:

Parameter	Value
Base	Special 4-pin, No. 5000B
Basing	RMA type 4BC
Maximum Overall Length	7.625 inches
Maximum Diameter	2.563 inches
Net Weight	7 ounces
Average Shipping Weight	2.0 pounds
Grid Connection	Side cap (Grid Cap No. 4001C)
Plate Connection	Top cap (Plate Cap)

The grid cap is positioned on the side of the glass envelope at a 60-degree angle relative to the vertical axis, while the plate cap is located at the top of the envelope. This physical separation of the grid and plate terminals minimizes interelectrode capacitance and increases voltage insulation.

Electrical Characteristics and Capacitances

The 152TL is a low- μ triode with an average amplification factor of 12. Its electrical characteristics are optimized for high-power RF and audio applications.

The average direct interelectrode capacitances are:

- **Grid-to-Plate (C_{gp}):** 4.4 pF
- **Grid-to-Filament (C_{gf}):** 4.5 pF
- **Plate-to-Filament (C_{pf}):** 0.7 pF

The transconductance of the tube is 7150 μ mhos, measured under the specific operating conditions of a plate current of 500 mA, a plate voltage of 3000 V, and a grid voltage of -85 V.

Class B Audio Frequency Operation

In Class B audio frequency power amplifier and modulator service, the 152TL can be operated either with zero grid current (where no driving power is required) or under typical driven conditions to achieve much higher power outputs. The absolute maximum ratings for Class B service per tube are:

- **DC Plate Voltage:** 3000 V
- **Max-Signal DC Plate Current (per tube):** 450 mA
- **Plate Dissipation (per tube):** 150 W

Operating configurations for two tubes in Class B service are detailed below:

Zero Grid Current Operation (2 Tubes)

Parameter	1500 V Supply	2000 V Supply	3000 V Supply
DC Plate Voltage	1500 V	2000 V	3000 V
DC Grid Voltage (approx.)	-105 V	-160 V	-260 V
Peak A-F Grid Input Voltage	210 V	320 V	520 V
Zero-Signal DC Plate Current	135 mA	100 mA	65 mA
Max-Signal DC Plate Current	286 mA	260 mA	220 mA
Max-Signal Driving Power	0 W	0 W	0 W
Effective Load (Plate-to-Plate)	5100 Ω	10500 Ω	24000 Ω
Max-Signal Plate Power Output	130 W	220 W	370 W

Typical Operation (2 Tubes)

Parameter	1500 V Supply	2000 V Supply	3000 V Supply
DC Plate Voltage	1500 V	2000 V	3000 V
DC Grid Voltage (approx.)	-105 V	-160 V	-260 V

Parameter	1500 V Supply	2000 V Supply	3000 V Supply
Peak A-F Grid Input Voltage	500 V	620 V	675 V
Zero-Signal DC Plate Current	135 mA	100 mA	65 mA
Max-Signal DC Plate Current	570 mA	500 mA	335 mA
Max-Signal Driving Power	15 W	13 W	3 W
Effective Load (Plate-to-Plate)	5500 Ω	9000 Ω	20400 Ω
Max-Signal Plate Power Output	560 W	700 W	700 W

Class C Radio Frequency Operation

For Class C telegraphy (key-down conditions without modulation), the 152TL serves as a highly efficient RF power amplifier or oscillator. The absolute maximum ratings in this service are:

- **DC Plate Voltage:** 3000 V
- **DC Plate Current:** 450 mA
- **DC Grid Current:** 75 mA
- **Plate Dissipation:** 150 W

Typical operating points for a single tube in Class C telegraphy are as follows:

Parameter	1500 V Operation	2000 V Operation	3000 V Operation
DC Plate Voltage	1500 V	2000 V	3000 V
DC Plate Current	333 mA	300 mA	250 mA
DC Grid Current	45 mA	42 mA	40 mA
DC Grid Voltage	-250 V	-300 V	-400 V
Plate Input	500 W	600 W	750 W
Plate Dissipation	150 W	150 W	150 W
Peak RF Grid Input Voltage (approx.)	400 V	455 V	550 V

Parameter	1500 V Operation	2000 V Operation	3000 V Operation
Driving Power (approx.)	16 W	18 W	20 W
Plate Power Output	350 W	450 W	600 W

Operating Curves and Driving Power Relationships

The performance of the 152TL is characterized by its constant current curves and driving power relationships. The constant current characteristics map grid voltage against plate voltage, illustrating plate current lines ranging from 0.125 A up to 3.0 A, and grid current lines from 25 mA up to 600 mA.

The relationship between plate efficiency, power output, and grid driving power is highly dependent on the operating plate voltage:

- At a plate voltage of 1500 V, typical Class C operation (Point A) achieves a balance of driving power and output power with plate dissipation limits plotted up to 150 W.
- At plate voltages of 2000 V (Point B) and 3000 V (Point C), the driving power requirements shift relative to the desired plate efficiency curves (ranging from 65% to 85%). These relationships show combined grid and bias losses only, and do not account for external circuit losses.

Technical Summary

The **152TL** is a high-power, low-mu triode featuring a thoriated tungsten filament capable of dual-voltage operation (5.0 V or 10.0 V). With an average amplification factor of 12 and a plate dissipation rating of 150 W, it is highly suited for Class B audio modulators and Class C RF amplifiers. Its physical design, featuring a side grid cap and top plate cap, ensures excellent electrical isolation and reliable performance up to its maximum plate voltage rating of 3000 V.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Eimac Tubes

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1950 EIMAC TUBES

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid -Plate	4.4	Grid -Plate 4.4 p.p.f
Grid-Filament [1]	4	Grid-Filament 4 .5 p.p.f
Grid-Filament [2]	5	Grid-Filament 4 .5 p.p.f
Plate-Filament	0.7	Plate-Filament - 0.7 p.p.f
D-C Plate Vol tage [1]	1500	D-C Plate Vol tage 1500 2000 3000 1500 2000 3000 3000 volts
D-C Plate Vol tage [2]	2000	D-C Plate Vol tage 1500 2000 3000 1500 2000 3000 3000 volts
D-C Plate Vol tage [3]	3000	D-C Plate Vol tage 1500 2000 3000 1500 2000 3000 3000 volts
D-C Plate Vol tage [4]	1500	D-C Plate Vol tage 1500 2000 3000 1500 2000 3000 3000 volts
D-C Plate Vol tage [5]	2000	D-C Plate Vol tage 1500 2000 3000 1500 2000 3000 3000 volts
D-C Plate Vol tage [6]	3000	D-C Plate Vol tage 1500 2000 3000 1500 2000 3000 3000 volts
D-C Plate Vol tage [7]	3000	D-C Plate Vol tage 1500 2000 3000 1500 2000 3000 3000 volts
Max.-S ig. D-C Plate Curren t , per t ube " [1]	4	Max.-S ig. D-C Plate Curren t , per t ube " 4 50 mao
Max.-S ig. D-C Plate Curren t , per t ube " [2]	50	Max.-S ig. D-C Plate Curren t , per t ube " 4 50 mao
Plate Dissipation, per tube ': '	150 W	Plate Dissipation, per tube ': ' 150 wat ts
D-C Grid Voltage (approx.) [1]	105 V	D-C Grid Voltage (approx.) - 105 -160 -260 -105 -160 -260 volts

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
D-C Grid Voltage (approx.) [2]	-160 V	D-C Grid Voltage (approx.) - 105 -160 -260 -105 -160 -260 volts
D-C Grid Voltage (approx.) [3]	-260 V	D-C Grid Voltage (approx.) - 105 -160 -260 -105 -160 -260 volts
D-C Grid Voltage (approx.) [4]	-105 V	D-C Grid Voltage (approx.) - 105 -160 -260 -105 -160 -260 volts
D-C Grid Voltage (approx.) [5]	-160 V	D-C Grid Voltage (approx.) - 105 -160 -260 -105 -160 -260 volts
D-C Grid Voltage (approx.) [6]	-260 V	D-C Grid Voltage (approx.) - 105 -160 -260 -105 -160 -260 volts
Peak A- F Grid Input Voltage [1]	210 V	Peak A- F Grid Input Voltage - 210 320 520 500 620 675 volts
Peak A- F Grid Input Voltage [2]	320 V	Peak A- F Grid Input Voltage - 210 320 520 500 620 675 volts
Peak A- F Grid Input Voltage [3]	520 V	Peak A- F Grid Input Voltage - 210 320 520 500 620 675 volts
Peak A- F Grid Input Voltage [4]	500 V	Peak A- F Grid Input Voltage - 210 320 520 500 620 675 volts
Peak A- F Grid Input Voltage [5]	620 V	Peak A- F Grid Input Voltage - 210 320 520 500 620 675 volts
Peak A- F Grid Input Voltage [6]	675 V	Peak A- F Grid Input Voltage - 210 320 520 500 620 675 volts
Zero-Signal D-C Plate Current [1]	135 mA	Zero-Signal D-C Plate Current 135 100 65 135 100 65 ma o
Zero-Signal D-C Plate Current [2]	100 mA	Zero-Signal D-C Plate Current 135 100 65 135 100 65 ma o
Zero-Signal D-C Plate Current [3]	65 mA	Zero-Signal D-C Plate Current 135 100 65 135 100 65 ma o
Zero-Signal D-C Plate Current [4]	135 mA	Zero-Signal D-C Plate Current 135 100 65 135 100 65 ma o
Zero-Signal D-C Plate Current [5]	100 mA	Zero-Signal D-C Plate Current 135 100 65 135 100 65 ma o
Zero-Signal D-C Plate Current [6]	65 mA	Zero-Signal D-C Plate Current 135 100 65 135 100 65 ma o
Ma x.-Signal D-C Plate Cu rrent [1]	286	Ma x.-Signal D-C Plate Cu rrent 286 260 220 570 500 335 ma o
Ma x.-Signal D-C Plate Cu rrent [2]	260	Ma x.-Signal D-C Plate Cu rrent 286 260 220 570 500 335 ma o
Ma x.-Signal D-C Plate Cu rrent [3]	220	Ma x.-Signal D-C Plate Cu rrent 286 260 220 570 500 335 ma o

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Ma x.-Signal D-C Plate Cu rrent [4]	570	Ma x.-Signal D-C Plate Cu rrent 286 260 220 570 500 335 ma o
Ma x.-Signal D-C Plate Cu rrent [5]	500	Ma x.-Signal D-C Plate Cu rrent 286 260 220 570 500 335 ma o
Ma x.-Signal D-C Plate Cu rrent [6]	335	Ma x.-Signal D-C Plate Cu rrent 286 260 220 570 500 335 ma o
Ma x.-Signal Driving Power (approx.l o o [1])	0 W	Ma x.-Signal Driving Power (approx.l o o 0 15 13 3 watts
Ma x.-Signal Driving Power (approx.l o o [2])	15 W	Ma x.-Signal Driving Power (approx.l o o 0 15 13 3 watts
Ma x.-Signal Driving Power (approx.l o o [3])	13 W	Ma x.-Signal Driving Power (approx.l o o 0 15 13 3 watts
Ma x.-Signal Driving Power (approx.l o o [4])	3 W	Ma x.-Signal Driving Power (approx.l o o 0 15 13 3 watts
Effec tive Load, Plate-to-P late [1]	5100	Effec tive Load, Plate-to-P late - 5100 10500 24000 5500 9000 20400 ohms
Effec tive Load, Plate-to-P late [2]	10500	Effec tive Load, Plate-to-P late - 5100 10500 24000 5500 9000 20400 ohms
Effec tive Load, Plate-to-P late [3]	24000	Effec tive Load, Plate-to-P late - 5100 10500 24000 5500 9000 20400 ohms
Effec tive Load, Plate-to-P late [4]	5500	Effec tive Load, Plate-to-P late - 5100 10500 24000 5500 9000 20400 ohms



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1962 Eimac

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1962 EIMAC

Section 1 · Triode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-Plate Capacitance	4.4 pF	—
Grid-Filament Capacitance	4.5 pF	—
Plate-Filament Capacitance	0.7 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Signal DC Plate Current	450 mA	ClassB
RF Typical Plate Voltage	3000 V	ClassC
RF Typical Plate Power Output	600 W	ClassC
AF Typical Plate Voltage	3000 V	ClassB;TwoTubes
AF Typical Plate Power Output	700 W	ClassB;TwoTubes



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Eimac Tube Manual

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1965 EIMAC TUBE MANUAL

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Voltage _ _ . . . _ [1]	5 V	Voltage _ _ . . . _ 5.Oor10.0 volts
Voltage _ _ . . . _ [2]	0 V	Voltage _ _ . . . _ 5.Oor10.0 volts
Current . . . _ . _ _ . _ [1]	12.5 A	Current . . . _ . _ _ . _ 12.5or6.25amperes
Current . . . _ . _ _ . _ [2]	25 A	Current . . . _ . _ _ . _ 12.5or6.25amperes
Grid-Plate . . . _ . _ . _ _	4.4	Grid-Plate . . . _ . _ . _ . 4.4pF
Grid-Filament _ _ . . _	4.5	Grid-Filament _ _ . . _ . . . 4.5pF
Plate-Filament _ . . _ . _	0.7	Plate-Filament _ . . _ . . . 0.7pF
Transconductance (i _p , = [1])	500 mA/V	Transconductance (i _p , = 500 rna., Eb= 3000V , Ee = -85V) 7150 umhos
Transconductance (i _p , = [2])	3000 mA/V	Transconductance (i _p , = 500 rna., Eb= 3000V , Ee = -85V) 7150 umhos
Transconductance (i _p , = [3])	-85 mA/V	Transconductance (i _p , = 500 rna., Eb= 3000V , Ee = -85V) 7150 umhos

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance (i _{g1} , = [4]	7150 mA/V	Transconductance (i _{g1} , = 500 rna., Eb= 3000V , Ee = -85V) 7150 umhos
DCplatevoltage _ _ _ . _ [1]	1500 V	DCplatevoltage _ _ _ . _ . 1500 2000 3000 1500 2000 3000 3000 volts
DCplatevoltage _ _ _ . _ [2]	2000 V	DCplatevoltage _ _ _ . _ . 1500 2000 3000 1500 2000 3000 3000 volts
DCplatevoltage _ _ _ . _ [3]	3000 V	DCplatevoltage _ _ _ . _ . 1500 2000 3000 1500 2000 3000 3000 volts
DCplatevoltage _ _ _ . _ [4]	1500 V	DCplatevoltage _ _ _ . _ . 1500 2000 3000 1500 2000 3000 3000 volts
DCplatevoltage _ _ _ . _ [5]	2000 V	DCplatevoltage _ _ _ . _ . 1500 2000 3000 1500 2000 3000 3000 volts
DCplatevoltage _ _ _ . _ [6]	3000 V	DCplatevoltage _ _ _ . _ . 1500 2000 3000 1500 2000 3000 3000 volts
DCplatevoltage _ _ _ . _ [7]	3000 V	DCplatevoltage _ _ _ . _ . 1500 2000 3000 1500 2000 3000 3000 volts
Max.-Signal DC Plate Current, per tube#	450 mA	Max.-Signal DC Plate Current, per tube# - 450 rna.
Plate Dissipation, per tube* _	150 W	Plate Dissipation, per tube* _ . . - 150 watts
DC Grid Voltage (approx.) _ [1]	-105 V	DC Grid Voltage (approx.) _ . . -105 -160 -260 volts
DC Grid Voltage (approx.) _ [2]	-160 V	DC Grid Voltage (approx.) _ . . -105 -160 -260 volts
DC Grid Voltage (approx.) _ [3]	-260 V	DC Grid Voltage (approx.) _ . . -105 -160 -260 volts
PeakAF GridInputvoltage _ _ _ [1]	500 V	PeakAF GridInputvoltage _ _ _ 500 620 675 volts
PeakAF GridInputvoltage _ _ _ [2]	620 V	PeakAF GridInputvoltage _ _ _ 500 620 675 volts
PeakAF GridInputvoltage _ _ _ [3]	675 V	PeakAF GridInputvoltage _ _ _ 500 620 675 volts
Zero-Signal DG plate current _ _ _ [1]	135 A	Zero-Signal DG plate current _ _ _ 135 100 65
Zero-Signal DG plate current _ _ _ [2]	100 A	Zero-Signal DG plate current _ _ _ 135 100 65
Zero-Signal DG plate current _ _ _ [3]	65 A	Zero-Signal DG plate current _ _ _ 135 100 65
Max.-Signal DC Plate Current _ [1]	570 mA	Max.-Signal DC Plate Current _ . 570 500 335

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Max.-Signal DC Plate Current _ [2]	500 mA	Max.-Signal DC Plate Current _ . 570 500 335
Max.-Signal DC Plate Current _ [3]	335 mA	Max.-Signal DC Plate Current _ . 570 500 335
Max.-Signal Driving Power (approx.) [1]	15 W	Max.-Signal Driving Power (approx.) . 15 13 3
Max.-Signal Driving Power (approx.) [2]	13 W	Max.-Signal Driving Power (approx.) . 15 13 3
Max.-Signal Driving Power (approx.) [3]	3 W	Max.-Signal Driving Power (approx.) . 15 13 3
Effective Load, Plate-to-Plate _ _ _ [1]	5500	Effective Load, Plate-to-Plate _ _ _ 5500 9000 20400
Effective Load, Plate-to-Plate _ _ _ [2]	9000	Effective Load, Plate-to-Plate _ _ _ 5500 9000 20400
Effective Load, Plate-to-Plate _ _ _ [3]	20400	Effective Load, Plate-to-Plate _ _ _ 5500 9000 20400
Max.-Signal plate Power Output _ [1]	560 W	Max.-Signal plate Power Output _ . 560 700 700
Max.-Signal plate Power Output _ [2]	700 W	Max.-Signal plate Power Output _ . 560 700 700
Max.-Signal plate Power Output _ [3]	700 W	Max.-Signal plate Power Output _ . 560 700 700
DCplatevoltage _ _ _ . _ _ _ [1]	1500 V	DCplatevoltage _ _ _ . _ _ _ 1500 2000 3000 3000 volts
DCplatevoltage _ _ _ . _ _ _ [2]	2000 V	DCplatevoltage _ _ _ . _ _ _ 1500 2000 3000 3000 volts
DCplatevoltage _ _ _ . _ _ _ [3]	3000 V	DCplatevoltage _ _ _ . _ _ _ 1500 2000 3000 3000 volts
DCplatevoltage _ _ _ . _ _ _ [4]	3 V	DCplatevoltage _ _ _ . _ _ _ 1500 2000 3000 3000 volts
DC Plate Current [1]	333 A	DC Plate Current 333 300 250 450 rna.

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