



ELECTRONIC TUBE REFERENCE

1544

Rectifier - Full Wave electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

RECTIFIER-RECTIFIER

Directly heated Philips double-anode mercury-vapor/gas industrial rectifier for heavy-current service. Its large filament and low arc voltage support tens of amperes of rectified output.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	1.9 V / 36 A	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Common cathode	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Rectifier	
PEAK INVERSE VOLTAGE	850 V
NOMINAL OUTPUT CURRENT	25 A
PEAK FORWARD CURRENT	70 A
FORWARD VOLTAGE DROP	15 V
WARM-UP TIME	120 s
Representative of two identical anode rectifier paths; published I_a max 12.5 A per anode.	

SECTION2 Rectifier	
PEAK INVERSE VOLTAGE	850 V
NOMINAL OUTPUT CURRENT	25 A
PEAK FORWARD CURRENT	70 A
FORWARD VOLTAGE DROP	15 V
WARM-UP TIME	120 s
Physical rectifier section 2; electrical properties populated from the same published ratings applicable to the identical rectifier path.	

1544 — Double-Anode Mercury-Vapour and Gas-Filled Rectifying Valve

The **1544** is an industrial-grade, double-anode rectifying valve containing both mercury vapour and gas filling. Designed primarily for heavy-duty industrial rectification applications, it is capable of delivering up to 25 A per valve in systems charging or powering up to 110 lead-acid (Pb) cells. The valve features a directly heated, oxide-coated filament and utilizes an auxiliary ignition electrode to facilitate reliable starting.

Mechanical Design and Physical Dimensions

The 1544 is a physically large, robustly constructed valve designed to be operated strictly in a vertical position with the base down. It features a distinct multi-bulb glass envelope structure with two prominent side arms housing the main anodes (designated a and a'), and a central bulb housing the cathode assembly and the auxiliary ignition electrode (a_h).

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

Parameter	Specification
Total Height	268 mm
Maximum Width (across anode arms)	Max 242 mm
Maximum Main Bulb Diameter	Max 84 mm
Lower Bulb/Base Diameter	Max 52 mm
Filament Lead Length	170 mm (flexible leads designated f , f)
Auxiliary Ignition Connection	M4 threaded terminal (a_h)
Net Weight	800 g
Shipping Weight	3000 g

Filament and Heating Requirements

The 1544 utilizes a directly heated, oxide-coated filament designed for AC operation. Due to the high current requirements of the cathode, the filament parameters are highly specialized:

- **Filament Voltage (V_f):** 1.9 V
- **Filament Current (I_f):** 36 A
- **Calculated Filament Power:** 68.4 W (derived from $1.9\text{ V} \times 36\text{ A}$)

Proper operation of a mercury-vapour valve requires a strict preheating schedule to ensure the cathode reaches its correct operating temperature and the mercury vaporizes properly before anode voltage is applied. The recommended heating time (T_w) is **2 minutes**. Under urgent circumstances, this preheating period may be reduced to a minimum of **1 minute**. However, following transport or after a prolonged interruption of service, a longer preheating period of **5 minutes** ($T_w = 5\text{ minutes}$) is mandatory to ensure proper distribution of the mercury. To automate and safeguard this preheating sequence, the use of a time delay switch (such as the type [4152](#)) is recommended.

Ignition and Auxiliary Circuitry

The 1544 exhibits a typical arc voltage (V_{arc}) of 15 V during normal conduction. To initiate the discharge, an ignition voltage (V_{ign}) of 50 V is required.

To reliably achieve this 50 V ignition threshold, the valve relies on an auxiliary ignition electrode (a_h). An auxiliary D.C. supply unit capable of delivering approximately 100 V at 25 mA must be connected between the auxiliary ignition electrode a_h (configured as positive, +) and the cathode (configured as negative, -). This connection must be made via a suitable current-limiting resistor to protect the ignition circuit. For this specific auxiliary supply function, the Philips Auxiliary Ignition Unit type E3 108 03 is recommended.

Electrical Ratings and Operating Limits

The operating parameters of the 1544 must be maintained within strict limits to prevent arc-back, cathode damage, or premature failure. The limiting values specified for the valve are:

- **Transformer Voltage (V_{tr}):** Maximum 275 V_{eff} , Minimum 60 V_{eff} (under specified circuit conditions, such as Circuit a)
- **Peak Inverse Anode Voltage ($V_{a\ inv\ p}$):** Maximum 850 V
- **Average Anode Current (I_a):** Maximum 12.5 A
- **Peak Anode Current (I_{ap}):** Maximum 70 A
- **Condensed Mercury Temperature (t_{Hg}):** 30 to 80 °C

The temperature of the condensed mercury (t_{Hg}) is a critical factor; operating outside the 30 to 80 °C range can lead to either insufficient vapor pressure (causing high arc drop and cathode sputtering) or excessive vapor pressure (reducing the peak inverse voltage capability and causing arc-back).

Technical Summary

The **1544** is a heavy-duty, double-anode, mercury-vapour and gas-filled rectifying valve designed for industrial power applications, particularly battery charging systems up to 110 lead-acid cells. Operating with a low-voltage, high-current filament (1.9 V / 36 A), it requires careful thermal management, including a mandatory preheating delay of 2 to 5 minutes. With a peak inverse voltage rating of 850 V and a peak anode current capability of 70 A, the 1544 provides robust rectification when paired with an auxiliary ignition supply to maintain its 50 V ignition threshold.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1999 Philips 0-D

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

1999 PHILIPS 0-D

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum RMS anode supply voltage	275 V	—
Minimum RMS anode supply voltage	60 V	—
Maximum average anode current per anode	12.5 A	—
Minimum series resistance	0.25 ohm	—
Permitted mercury/ambient temperature	30–80 degC	—
DC output current	25 A	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Ignition voltage	50 V	—

1999 PHILIPS 0-D

Section 2 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum RMS anode supply voltage	275 V	—
Maximum RMS anode supply voltage	275 V	—
Minimum RMS anode supply voltage	60 V	—
Minimum RMS anode supply voltage	60 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum average anode current per anode	12.5 A	—
Maximum average anode current per anode	12.5 A	—
Minimum series resistance	0.25 ohm	—
Minimum series resistance	0.25 ohm	—
Permitted mercury/ambient temperature	30–80 degC	—
DC output current	25 A	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Ignition voltage	50 V	—

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes, and their source documents.

[Catalog](#) [Tube types](#) [Full books](#) [Blog](#) [Feedback & corrections](#)

© 2026 Tube Tinker