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Type 50 Data Sheet

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Description



Introduced in 1928 by RCA, the historical 50 tube, was one of the first higher power triodes for Audio Applications. The curves of this tube are extremely nice, and so distortion will be very low, even at high signal. For that reason, it was originally recommended to use transformer coupling, which method is the safest for high output power circuits. Although the EML50 is much higher quality than the original 50 tubes, and the EML can safely be used capacitor coupled, you can stay closer to the original circuits and design ideas, by using transformer coupling. (Some circuits with the LL1660 will be added to a later version of this data sheet)

[High Resolution](#)

Operation and operating points are identical to the historical 50, but it is also possible to use the EML at higher Anode dissipation, up to maximum 28 Watt continuous.

The quality of modern transformer cores is significantly higher than in the first days of tube production, and step-up coupling transformers can be found with perfect full HiFi properties. We recommend the Lundahl LL1660 Series here. These have a passive gain of 2.5 and seem the ideal combination with this tube.

Guarantee program for first owner.

The first owner can register the tube within 4 weeks after receival, at the Emission Labs ® website, to participate in the 5 years guarantee program, which is additional to the legal obligations of the seller.

[Our Guarantee conditions](#)

[Register here for the 5years guarantee](#)

Features

- Gold Plated Grid
- Hard metal Construction (Note1)
- Extra large getters
- Hand blown Glass bulb
- Anti-microphonic Anode- and grid suspension
- These tubes are shipped in a [high quality dual box](#)
- Tube printing with real gold (metal), red color is glass burned into the glass
- Gold Plated pins, black ceramic socket. (White bottom.)

Sound Character of the EML 50



Article from 1928 about the introduction of the 50 tube.

[Pdf Article](#)

Specially intended for use with the historical type 50, the type 81 mono diode was introduced at that time. At EML we did the same thing, we introduced the 50 and the 81 together. In order to make a rectifier circuit, the classical way, just parallel the heaters of the 81 mono diode, and the result is a double diode, which is more powerful than a tube like 5U4G.



According to Ing. Alesa Vaic, who was the first re-introduce the 300B in 1994 (under the Vaic Valve brand), DHT tube families, are soundwise characterized by their heater voltage. This explains the popularity of the European 4Volt tubes, like AD1, PX4, PX25, RE604, but also 2.5V tubes like 45 and 2A3 have their own fans. The 50 (and also the 81 mono diode) with it's 7.5V heater are a family of it's own for this reason.



The EML50 is made with a boxed anode, which makes the tube larger than the RCA tube, and we get less distortion in return for that. This can already be seen by looking at the curves, which are simply excellent. Though there is a resemblance with 300B, the 50 is different. The 50 feels best at higher voltage and higher impedance. The of such tubes is softer, silkier, less dominant as a low gain tube

like 300B.

Something which influences the sound very much, is the option of the EML50, to exceed the Anode voltage of the RCA, which is possible because of the boxed anode of EML (vs the tiny construction of RCA).



Here is a [fantastic report](#) about a 50 Amplifier, placed here with the friendly permission of Raymond Woerdman from Holland. It is in Dutch, perhaps you can find a way to translate it online.

EML 50 Filament Ratings	
Filament Voltage	7.5Volt (AC or DC)
Electronic heater modules:	Only voltage source
Tolerance on filament voltage	5%
Filament Current	1.25Ampere
Maximum Time on Stand By (Heater voltage only)	2 hours

EML 50 Maximum Conditions not possible simultaneously	
Anode Voltage	500Volt
Continuous Anode Dissipation	28Watt
Peak Anode Dissipation (Not continuous)	35Watt
Anode Current	120mA
Grid resistor with Auto Bias	250k Ohm (note4)
Grid resistor with Fixed Bias	50k Ohm (note4)

EML 50 Factory Test conditions	
Anode Voltage	400V
Anode Current	55mA

EML 50 Typical Data *1

Anode Voltage	350V	400V	450V
Anode Current	45mA	55mA	55mA
Anode Dissipation	15.8Watt	22Watt	24.8 Watt
Control Grid Voltage	63Volt	70Volt	84Volt
Anode Impedance (Rp)	1900 Ohm	1800 Ohm	1800 Ohm
Amplification Factor	3.8	3.8	3.5
Transconductance (Gm)	2mA/V	2.1mA/V	2.1mA/V
Load Impedance (Ra)	4100 Ohm	3670 Ohm	4350 Ohm
Power Output in Class A	2.4 Watt	3.4 Watt	4.6 Watt
h2 Distortion at full signal	3,4%	3,62%	4.1%
h3 Distortion at full signal	0.8%	0,87%	1.04%
Reference	here	here	here

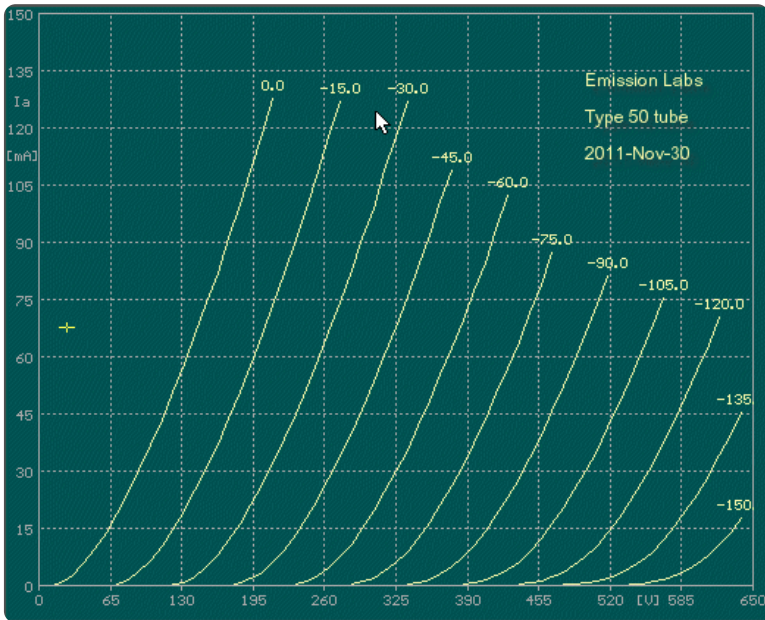
***1 These working points are identical to the historical data sheet.**

Note: We have calculated distortion of the EML50, at the power level of the RCA data sheet. The simulation shows, these are well chosen working points, considering the relatively low working voltage. The EML50 has somewhat higher efficiency, and appr. 15% more output power will be achieved.

EML 50 Typical Data, not possible with historic tubes *2

Anode Voltage	485V	485V	
Anode Current	57mA	57mA	
Anode Dissipation	28 Watt	28 Watt	
Control Grid Voltage	89.5Volt	89,5Volt	
Anode Impedance (Rp)	1400 Ohm	1400 Ohm	
Amplification Factor	3.7	3.7	
Transconductance (Gm)	2.7mA/V	2.7mA/V	
Power Output in Class A	6.7 Watt	5,7 Watt	
Load Impedance (Ra)	5000 Ohm	7000 Ohm	
h2 Distortion at full signal	.4.5%	2.78%	
h3 Distortion at full signal	1.2%	0,65%	
Lundahl SE Output Transformer	LL1623-60mA	LL9202-60mA	
Reference	here	here	

*1 These working points take advantage of the higher capabilities of the EML50 vs historical RCA tubes. The column with 5k load impedance is similar with the RCA use. The second column is focussed on lower distortion, which comes at slightly lower output power.



[Print Version](#)

EML 50 Mechanical Data	
 Logo on this side Plates parallel to this side	Size including Socket (but excluding pins) 145 x 58 mm
Single Tube weight	145 Gram
Shipment weight for pair in gift box	700 Gram

Notes

1. Hard-metal can be used in electron tubes, though this is more difficult to use, and more costly than classic nickel. It results in a more precise Anode distance, and does not damage in shipment. It ensures reproducible tube parameters, and long term stability. Wolfram grids allow the most precise grid wire distance, because wolfram is an extreme hard metal. Best grid geometry ensures uniformity and linearity of the tube curves.
2. Individual Test data, such as: Matching Data, Grid Current, Vacuum, Filament Current, etc., are on the Certificate that is on the outside of the tube box. Each tube is numbered from the inside, with a metal [Tag](#)
3. Average Plate Characteristics are made with the Sofia Digital Curve tracer.
4. Do not experiment with lower filament voltage, to expect better lifetime. We already specify filament voltage for the best lifetime.
5. Gold Plated grids have a few advantages, such as increased bias stability, some protection against accidental overload, and better linearity of tube curves.