

PENTODE for use in telephone equipment with a life longer than 10 000 hours

MECHANICAL DATA

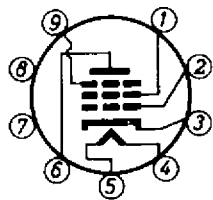
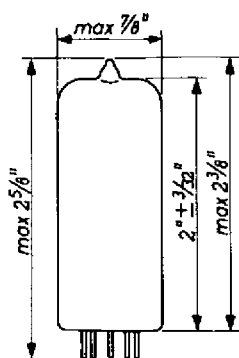
Cathode	Coated unipotential
Base	E9-1
Bulb	T6½
Mounting position	Any
RETMA basing designation	9BK

TUBE OUTLINE

BOTTOM VIEW
OF BASE

BASE PIN
No.

ELEMENT



1	Grid No.2
2	Grid No.1
3	Cathode
4	Heater
5	Heater
6	Plate
7	Internally connected
8	Internally connected
9	Grid No.3; internal shield

ELECTRICAL DATA

HEATER DATA

Heater voltage ¹⁾	min.	bogey	max.	
		6.3		volts
Heater current at 6.3 volts ²⁾	0.285	0.300	0.315	amp

¹⁾ In order to obtain a tube life of 10 000 hours in case of parallel supply of the heaters, the maximum variations of the heater voltage should be less than $\pm 5\%$ (absolute limits)

²⁾ In order to obtain a tube life of 10 000 hours in case of series supply of the heaters, the maximum variation of the heater current due to voltage fluctuations and tolerances in the parts should be less than $\pm 1.5\%$ (absolute limits)

DIRECT INTERELECTRODE CAPACITANCES

	bogey	max.
Plate to all other elements	3.6	4.2 μF
Grid No.1 to all other elements	8.5	9.2 μF
Plate to grid No.1		0.015 μF
Grid No.1 to heater		0.15 μF
Cathode to heater	4.0	μF
Grid No.1 to all other elements at a cathode current of 12.1 mamps	11.3	μF
Radiation capacitance of plate ³⁾		0.025 μF
Radiation capacitance of grid No.1 ³⁾		0.025 μF

RATINGS (design center values)

Plate voltage	210 volts
Plate voltage (without current)	550 volts
Plate dissipation	2.1 watts
Grid No.2 voltage	210 volts
Grid No.2 voltage (without current)	550 volts
Grid No.2 dissipation	0.35 watt
Cathode current	16 mamps
Grid No.1 circuit resistance (with automatic bias)	1 megohm
Voltage between heater and cathode	100 volts
External resistance between cathode and heater ⁴⁾	20 000 ohms
Bulb temperature	170 °C

³⁾ Radiation capacitance is the capacitance of the concerning electrode to a surrounding box with an inner diameter of 2 1/16" and a length of 3 7/8", the other electrodes being earthed

⁴⁾ For stable operation it is advisable to restrict the external resistance between heater and cathode to values smaller than 20 000 ohms

<u>TYPICAL CHARACTERISTICS</u>			
	min.	bogey	max.
Plate voltage		210	volts
Grid No.3 voltage		0	volt
Grid No.2 voltage		120	volts
Cathode resistor		165	ohms
Plate current ⁵⁾	8.7	10	11.3 mamps
Grid No.2 current ⁵⁾	1.7	2.1	2.5 mamps
Transconductance ⁵⁾	7800	9000	10200 micromhos
Amplification factor of grid No.2 with respect to grid No.1		34	
Plate resistance	0.3	0.5	megohm
Equivalent noise resistance (R.F.)		750	1000 ohms
Equivalent noise resistance (30-10 000 c/s)			36000 ohms
Negative grid No.1 bias at plate current of 0.5 mamp	3.0		5.25 volts
Grid current starting point			
Grid No.1 bias at grid No.1 current = +0.3 μ A			-1.1 volts
Negative grid current (grid ⁵⁾ series resistor 0.1 megohm)			0.5 μ amp
Grid No.1 hum voltage (grid ⁶⁾ leak = 0.5 megohm)		0.06	0.5 mvolt
Insulation between two electrodes	20		megohms
Insulation between cathode and heater (voltage between heater and cathode 100 volts)	5		megohms
Heating time of the cathode (till half the ultimate plate current)	8	13	20 sec
Cooling time of the cathode (till half the original plate current)	7	12	sec

⁵⁾See page 4

⁶⁾This value has been measured at a mains frequency of 50 c/s with the electric center of the heater connected to earth. The voltage has been measured in the anode lead with the aid of a band-pass filter linear from 30-200 c/s and translated into a hum voltage on the grid.

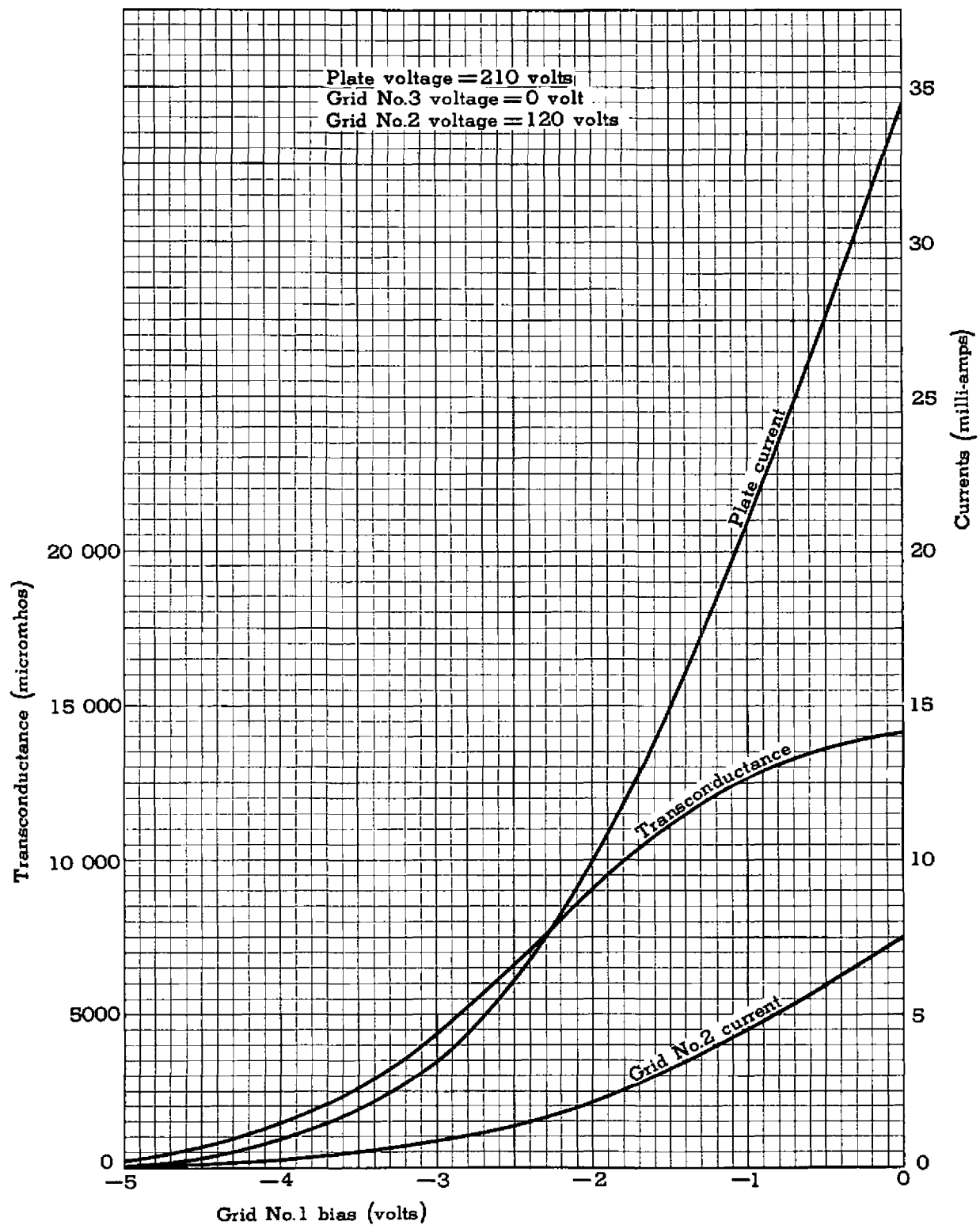
OPERATING CHARACTERISTICS for use as class A amplifier
(Measured with a resistor of 0.33 megohm in series with
grid No.1 as internal resistance of the driver tube.)

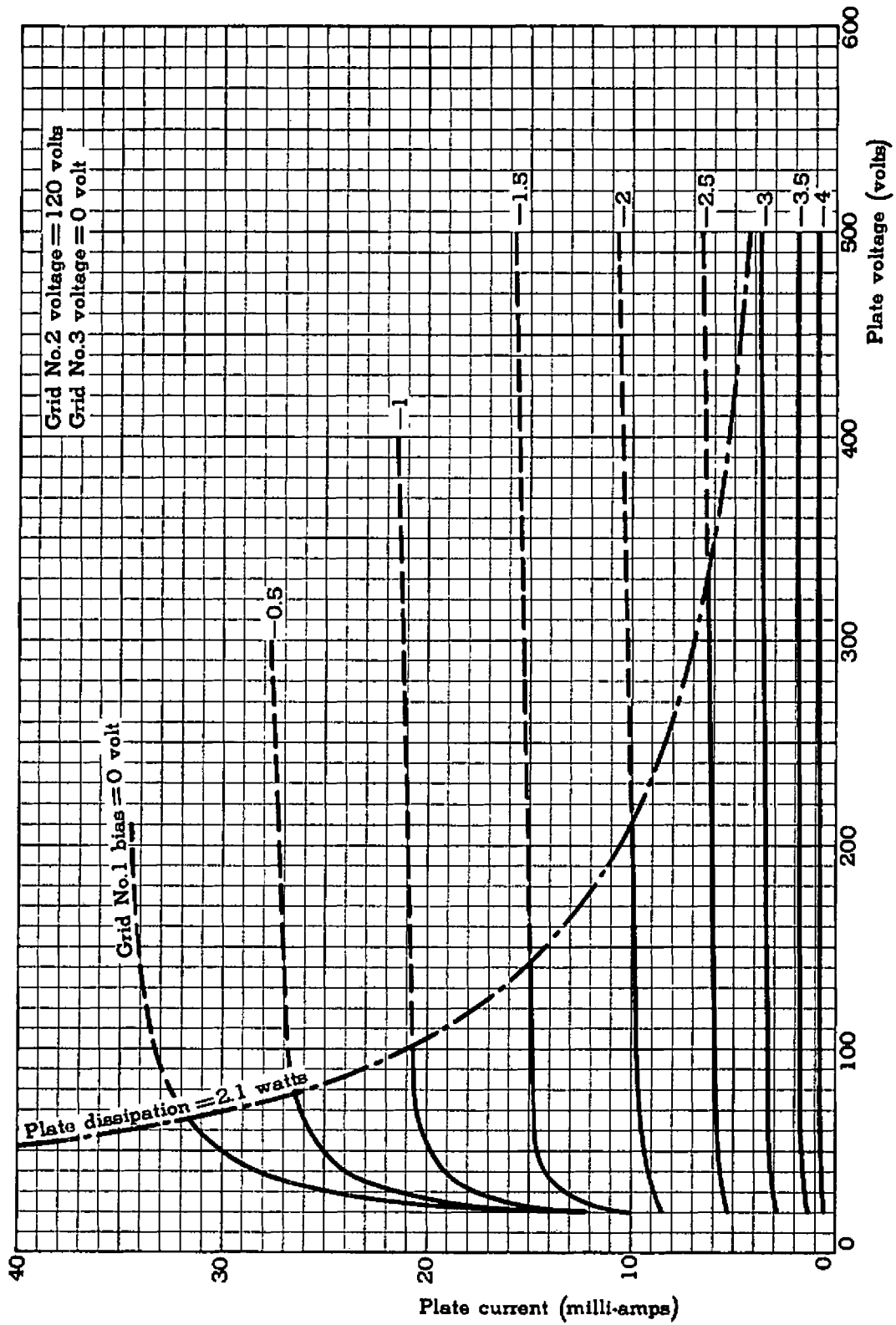
Plate voltage	120	210 volts
Grid No.3 voltage	0	0 volt
Grid No.2 supply voltage	120	120 volts
Grid No.2 series resistor	5600	5600 ohms
Cathode resistor	180	180 ohms
Plate current	8.3	8.3 mamps
Grid No.2 current	1.7	1.7 mamps
Transconductance	8200	8200 micromhos
Plate resistance	0.42	0.44 megohm
Load A.C. resistance	10 000	20 000 ohms
Output power at a distortion of 10 percent	340	660 mwatts
Input A.C. voltage at a distortion of 10 percent	1.1	1.1 volts(rms)
Output power at grid No.1 current = +0.3 μ amp	400	870 mwatts
Input A.C. voltage at an output power of 50 mwatts	0.35	0.25 volt (rms)

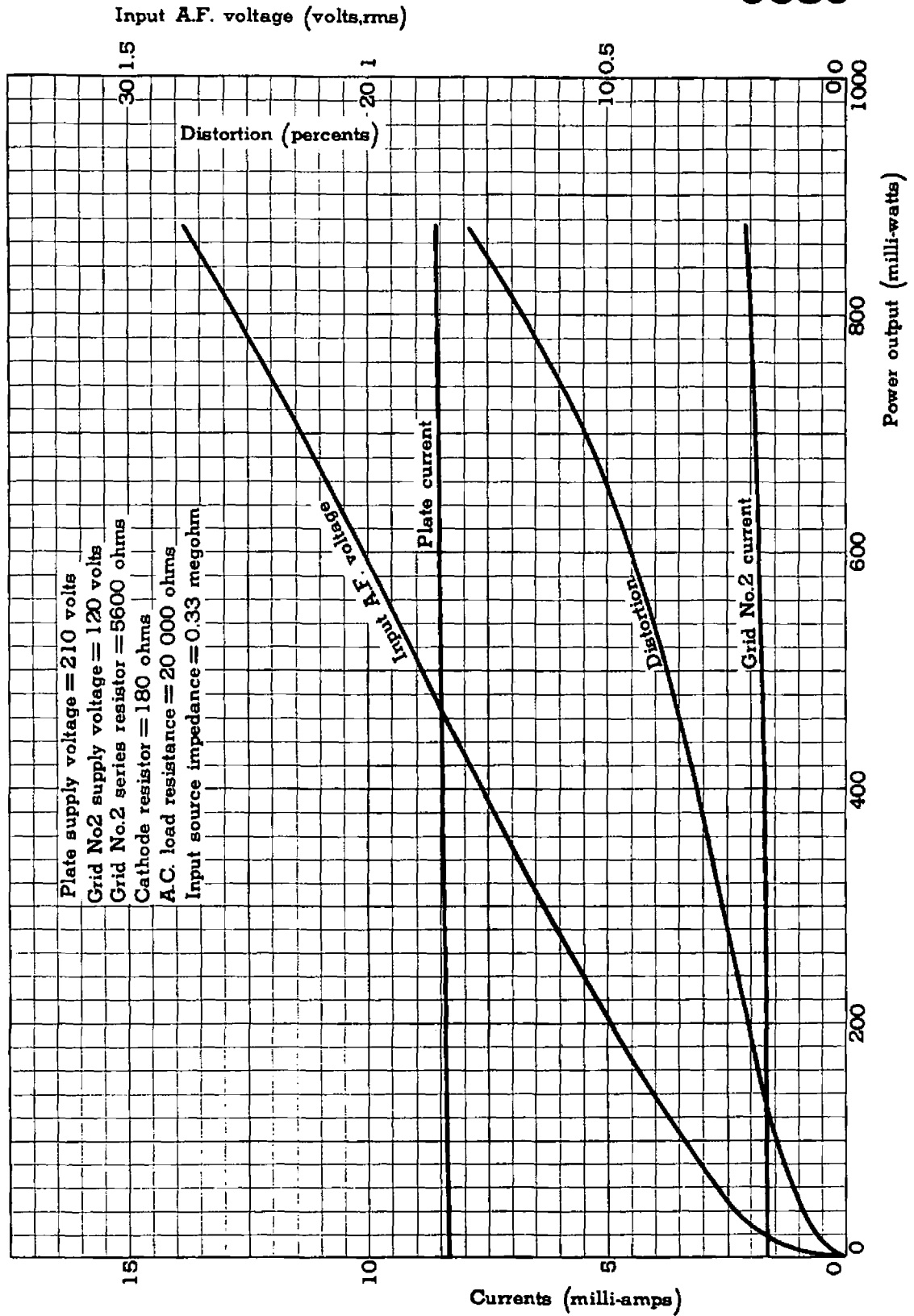
⁵) END POINT OF LIFE

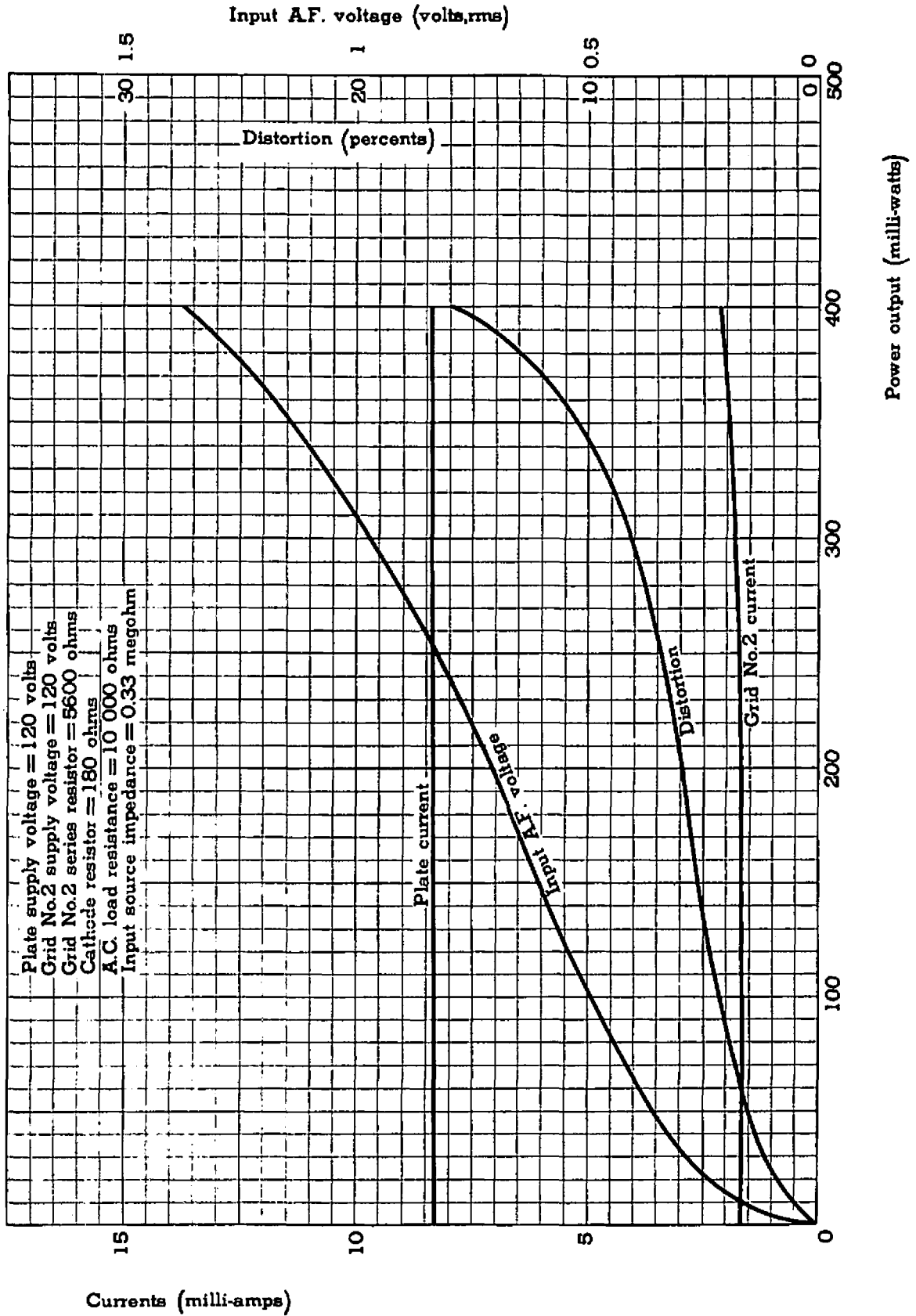
The end point of life of the tube is reached when one or more of the characteristics have changed to the following values:

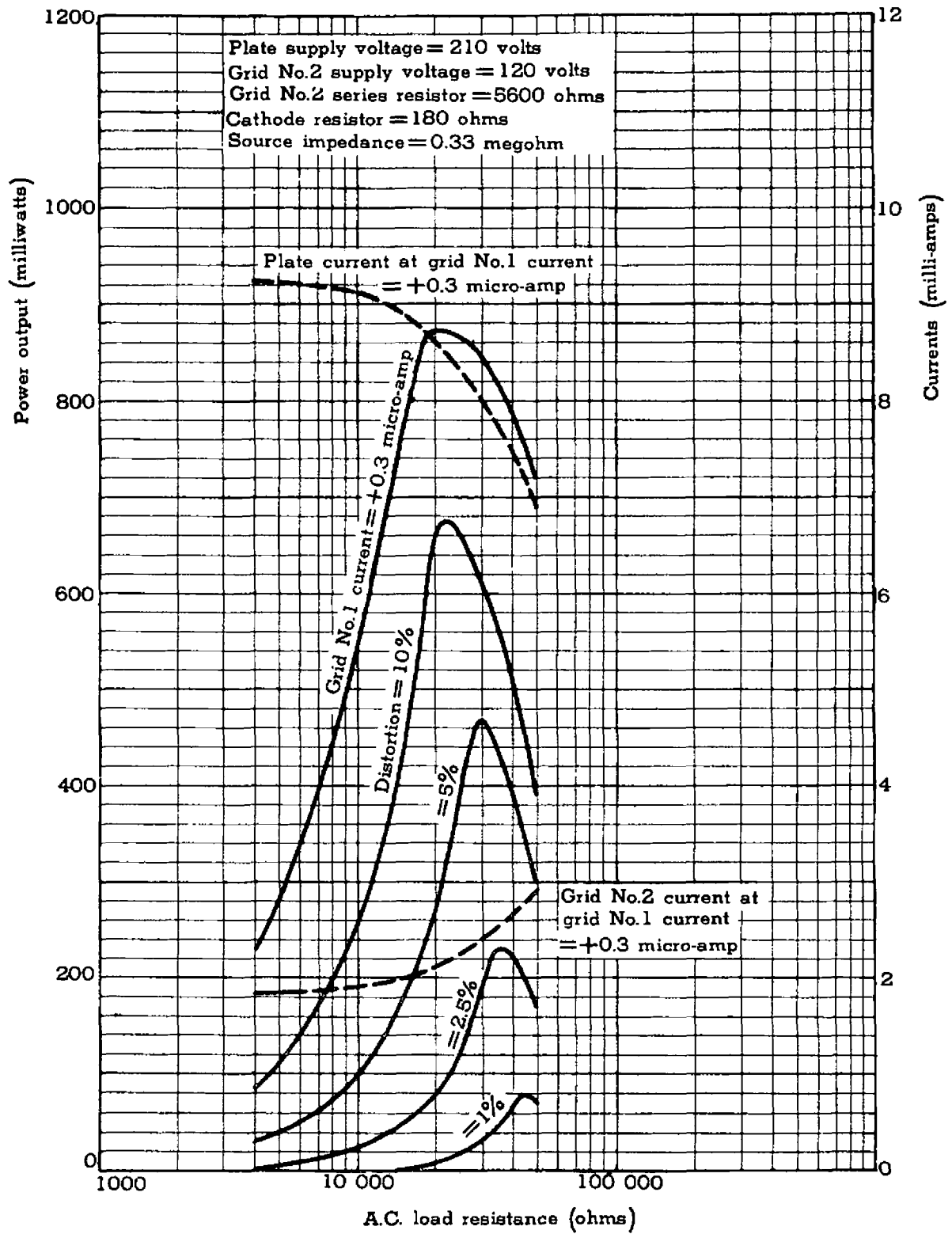
Plate current	$\leq$	7.0 mamps
Grid No.2 current	$\leq$	1.25 mamp
Transconductance	$\leq$	6400 micromhos
Negative grid current (grid series resistor = 0.1 megohm)	$\geq$	1.0 μ amp

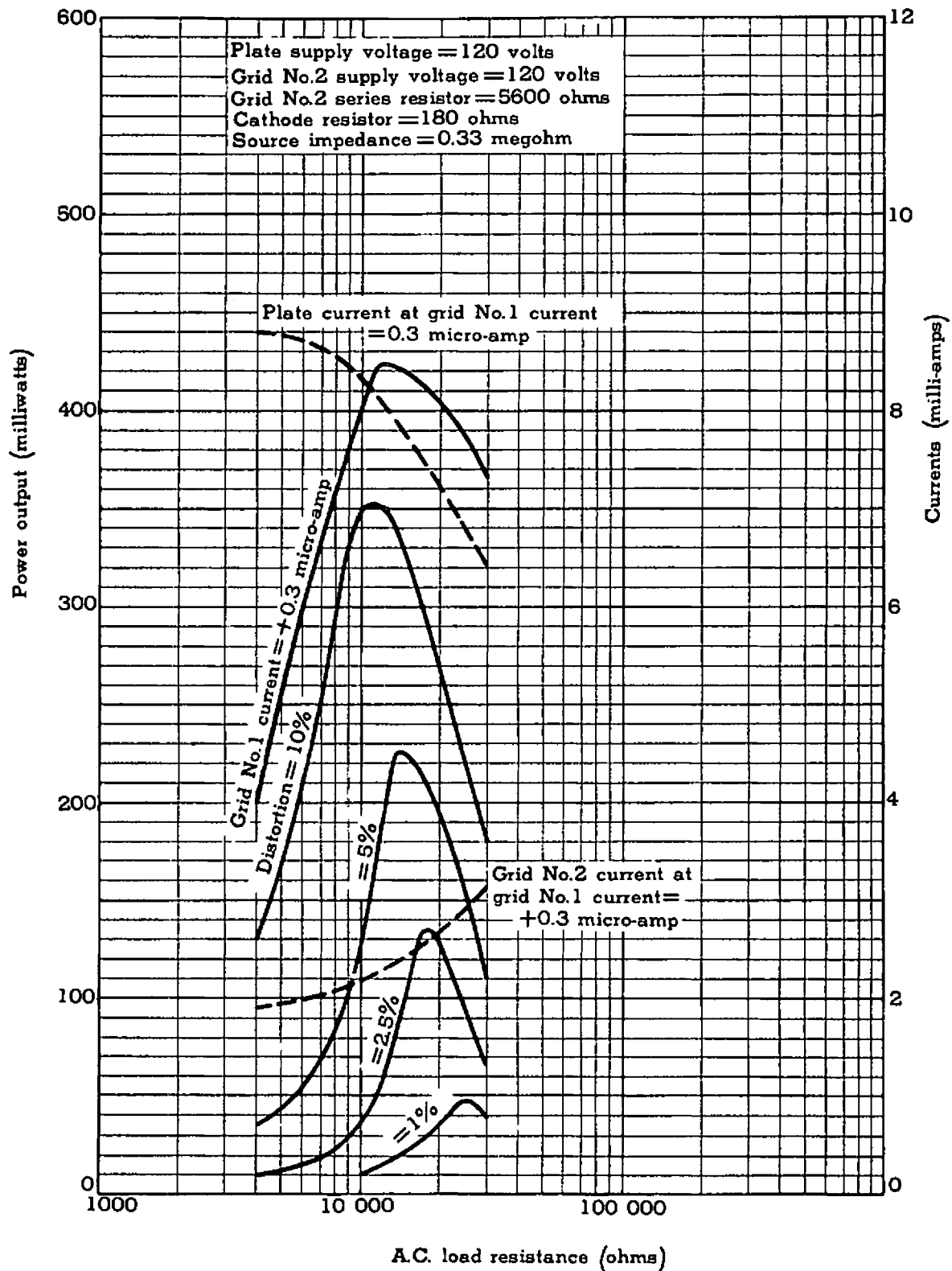


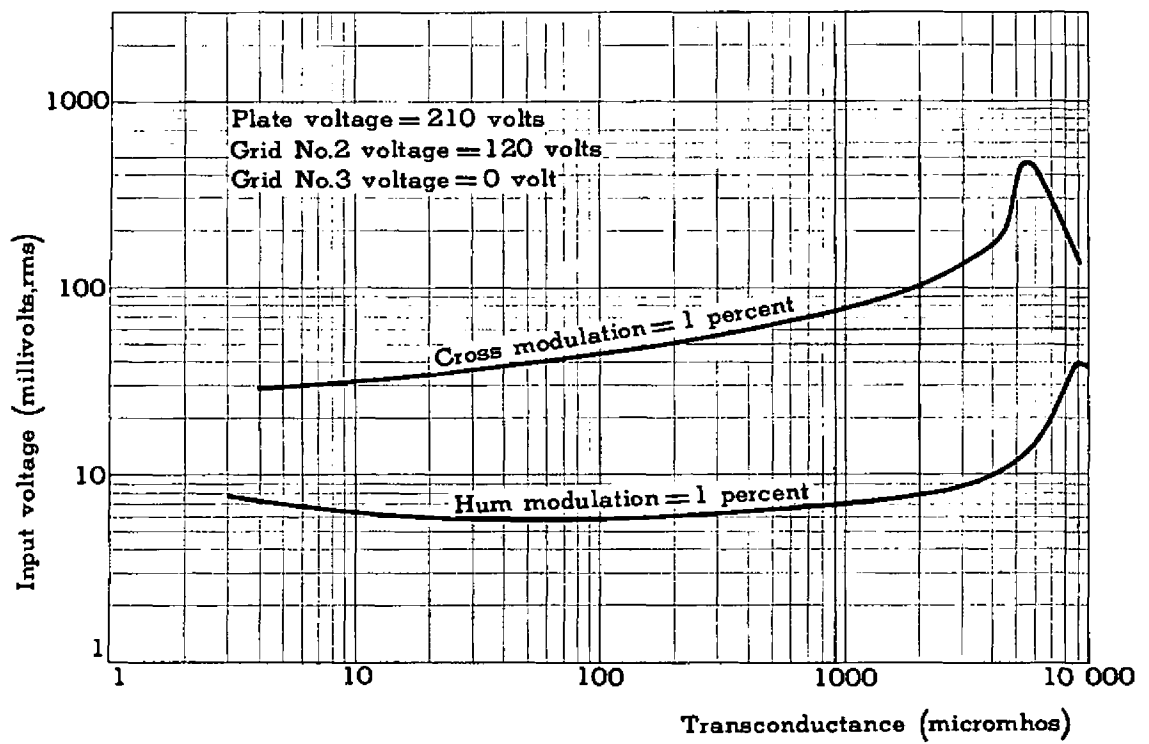


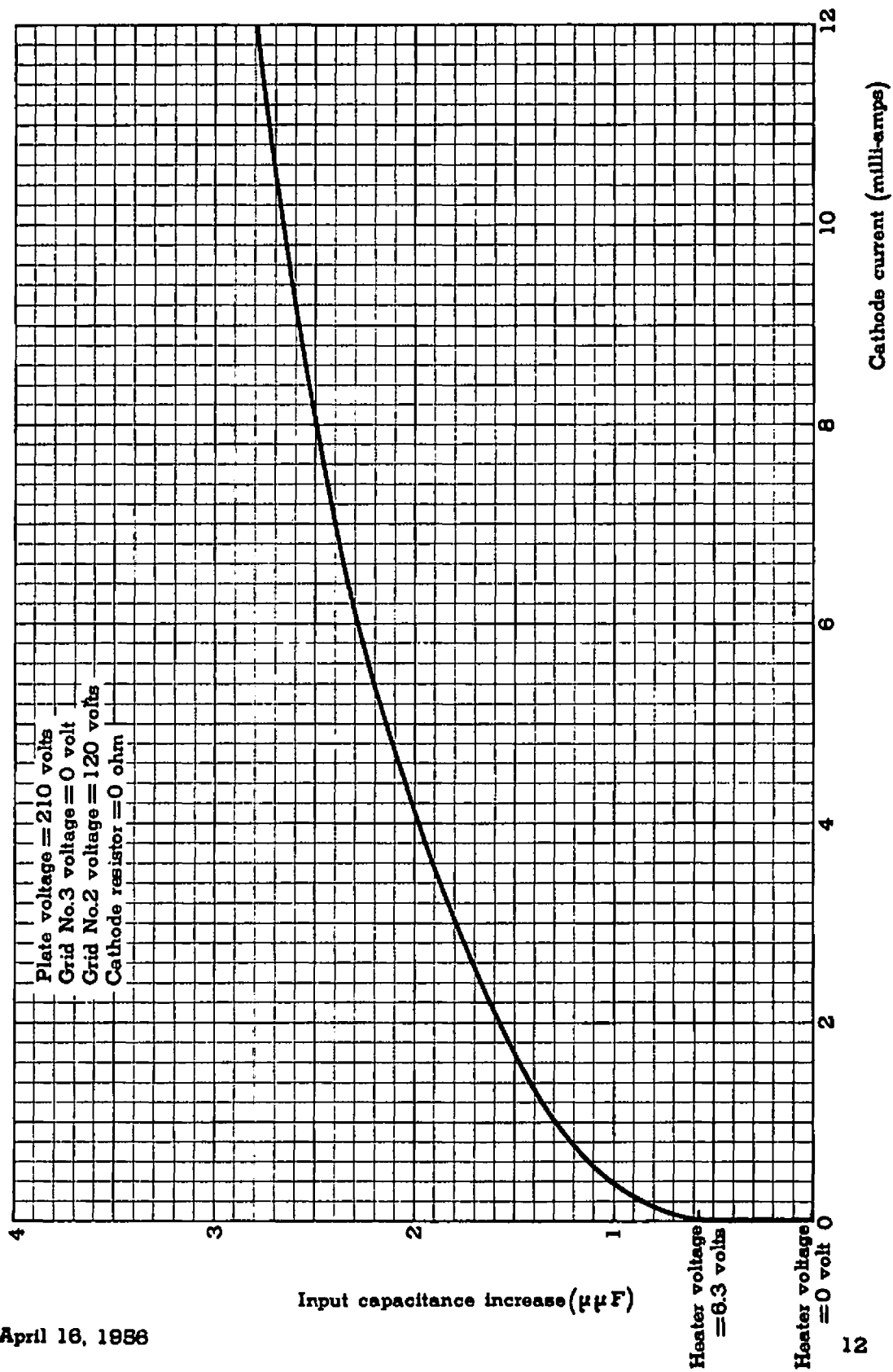












April 16, 1956

