RDH4 on page 526 (sec. 13.3.iii.E) has this to say about Pentode screen dissipation:

...[I]f a dynamic loadline cuts the zero bias curve below the knee, the screen current will rise rapidly and the screen dissipation may be exceeded. The average maximum-signal screen current may be calculated from the approximation:

$$I_{g2av} = \frac{1}{4} I_A + \frac{1}{2} I_Q$$

where I_A = screen current at minimum plate voltage swing and zero bias (point A, fig. 13.21), and I_Q = screen current at no signal and normal bias.

The screen dissipation is therefore P_{g2} where

$$P_{g2} = E_{g2} I_{g2av} = E_{g2} \left(\frac{1}{4} I_A + \frac{1}{2} I_Q \right)$$

The variation of screen current with change of control grid voltage is such that the ratio between the plate and screen currents remains approximately constant provided that the plate voltage is considerably higher than the knee of the curve. This ratio may be determined from the published characteristics.

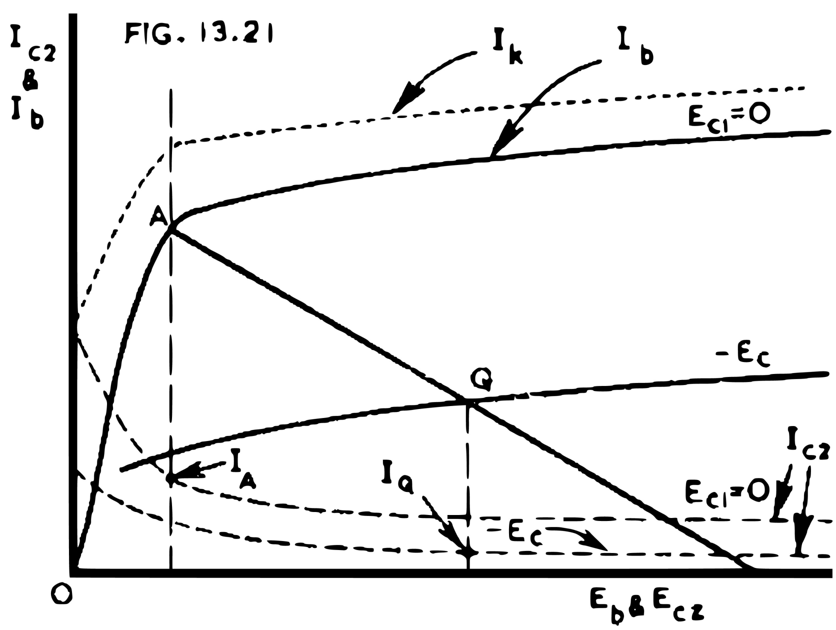
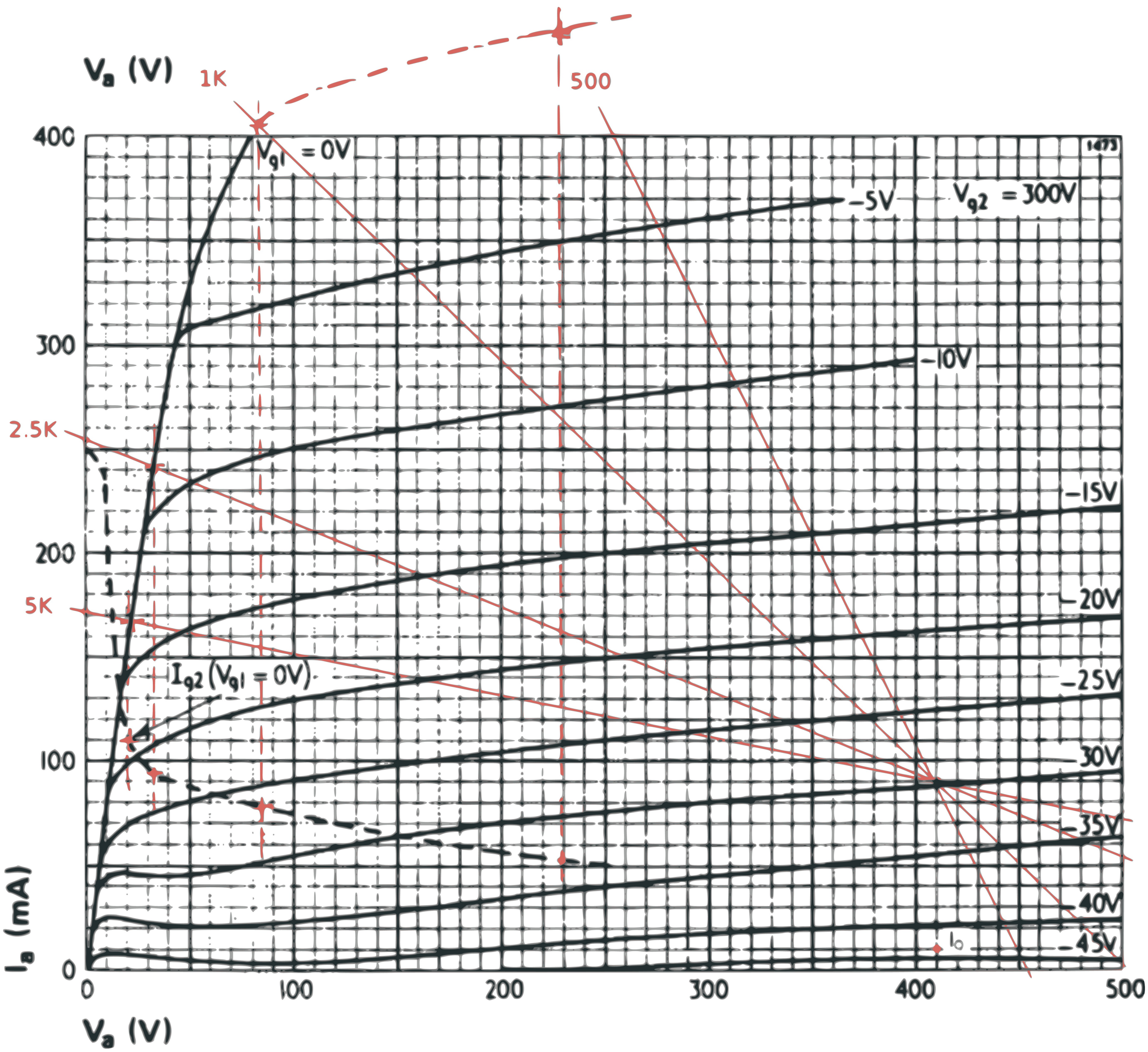


Fig. 13.21. Plate, screen and cathode current characteristics of pentode.

Referring to the KT88 curves data sheet for a Single Ended amplifier, I estimate that I_Q for a quiescent operating point of 410V @ 91mA will likely fall in the neighborhood of 5mA. I'm basing this estimate on characteristics of an amplifier with plate and screen voltages set to 250V, and this value is probably on the conservative side. Quiescent plate current may actually be higher and should be measured for an actual amplifier. Additionally, 300V is the highest screen voltage for which I have found plate curves. Therefore, the dissipation estimates will also be conservative if screen voltages run higher than 300V.

I drew four load lines of 5K, 2.5K, 1K, and 500R through the quiescent operating point as follows:



From these load lines, I obtained the I_Q, I_A, I_{g2} and P_{g2} values for each load line:

Load (Ohms)	**I_Q (mA)**	**I_A (mA)**	**I_{g2} (mA)**	**P_{g2} (W)**
5K	0.005	0.110	0.030	9
2.5K	0.005	0.094	0.026	7.8
1K	0.005	0.078	0.022	6.6
500R	0.005	0.053	0.016	4.72

As you can see, loads with impedances greater than 1K ohms are exceeding the design-maximum values for screen dissipation. At high screen voltages, the KT88 wants a much lower load impedance that what is specified in the SEL design documents.

Run screens at greater than 300V will worsen the problem and you may need even lower impedance loads to compensate.