Subject: Re: Tubes versus Transistors
Posted by positron on Tue, 26 Jul 2022 21:48:50 GMT
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For your convenience, here is a link to the article "Picking Capacitors" by Walter Jung and Richard Marsh, Audio Magazine, Feb 1980.

https://milbert.com/Files/articles/Picking_Capacitors_1.pdf

Open the .pdf for the article.

Notice graph B4, the X axis is frequency rising with the arrow pointed right.
The Y axis is Z, the impedance is rising with the arrow pointing up.

From left to right, the line Xc is the capacitive reactance (let's call it ac resistance). Notice the real capacitor's resistance is dropping/sloping down until it touches the X axis, zero ac resistance and stays zero resistance to infinity frequency.
That is a perfect capacitor.

However, a real world capacitor is not perfect.
Notice at Rs, the line is curving and then rising, now called XL.
At Rs, the capacitor is actually becoming an inductor/choke, with inductive reactance (ac resistance) becoming prominent. (However, there is no dc current flowing.)

Now let's go to figure 7. This shows a few electrolytic capacitors and the Rs frequency. Notice how the line for each capacitor starts to curve at "Rs" and then rises.

Notice most curvature starts below 1,000 cycles per second, less than 1khz and all by 10khz. Of course that is well within the audible range. This is the value of capacitors used in solid state and some tube designs.

Newer capacitors are still quite poor compared to poly type capacitors. Of course, a very small electrolytic capacitor will not come close to matching any poly capacitors in figures 9A-D.

I hope this helps in understanding why electrolytic capacitors are not desirable in any analog electronic components, except well away from the direct musical signal path. This especially includes the decoupling capacitor next to the plate resistor.

cheers

pos