
[Electrolytic capacitors for audio purposes](#)

The reputation of the electrolytic capacitors is not flattering. They are accused to be the worst component causing distortions in any circuit of a high-end audio network. It doesn't matter if the good old electrolytic capacitor is sitting as a quick power source in the power supply or as a coupling capacitor in the pre- or power amplifier or in the crossover filter of a speaker system, they just destroy the whole thing.

They have a high dielectric absorption causing serious phase(frequency) delays. Signals going through electrolytics are slowed down and suffer severe harmonic distortion. They have high impedance and ESL value at higher frequencies and their resonance frequency is too low to be used in a wide band amplifier. Most of the accusations are true, but then everybody knows that the electrolytics are indispensable because of their unbeatable C/V ratio. It is necessary and possible to improve the worst drawbacks of the electrolytics.

Many companies have made attempts in this direction. By using smooth or low etched foils to improve the frequency characteristic of the capacitor the yield capacitance and the C/V ratio is decreased. Bipolar electrolytics has become very popular now. The ESR and the impedance at high frequencies can be improved by choosing special paper tissue and low viscosity, low resistance electrolyte solutions.

The mechanical design and the construction of the capacitors play an important role as to how they are sounding. An tight wound, properly connected and well fixed winding in a good shielded case and suitable short terminals sometimes do miracles to the sound, usually immeasurable but very audible. Special solutions for decreasing the non-linear harmonic distortion and noise level at higher frequencies caused by ion transfer in electrolytics in comparison with electron transfer in the other components, are also known. (Black Gate, Cerafine etc.) Many have made efforts to improve one or more features of electrolytic capacitors with the intention that it would also sound better and thus be more applicable for high-end audio systems.

The problem is that most of the improvement efforts made have been concentrated on a range of measurable parameters and did not take the electrolytic capacitor as an audiosonic component into consideration. Companies producing and developing electrolytics look for measurable improvements to document their ability to meet the higher and higher or extraordinary requirements of the electronic industry and they don't care about the sonic features of the new product.

Owing to more than 20 years experience in producing and developing electrolytic capacitors we have made a lot of efforts to make the electrolytics much better and suitable for high-end audio. We did not only carefully analyse the drawbacks and insufficiencies of electrolytic capacitors in high-end circuits but also we have also participated in innumerable listening tests together with people building and developing amplifiers and loudspeakers. As a result of our year long activity in this field we can proudly say that our electrolytic capacitors represent the

cutting edge quality today.

What makes our capacitors better than the other electrolytics declared "audio signal" and "very high frequency" products?

The answer is simple: we did not only take all the chemical and electrochemical factors, electrical and mechanical parameters and constructional features which could influence the sound quality into consideration. We have also investigated the total effect and the general sonic impression of the individual changes we had made during our development activities.

This gives the audible plus.

In addition to the concept of completeness let us mention a few considerations playing a significant role in our work:

paper density and porosity
electrolyte viscosity and molecular dimension
etching structure
oxide layers dielectric constant (relative permittivity),
composition and forming voltageand many others.