TECHNICAL COMPARISON OF THIN VERSUS THICK CABLES

How can Mapleshade's cable be so thin but sound so good?

The simplest answer is that our ClearTone cable makes your instruments sound so good **because** it is so thin, by design. Conventional cables sound much duller and more compressed **because** they are ridiculously, needlessly thick. Why are ClearTones invariably preferred in listening comparisons? For three principal technical reasons, based on our thirty years of meticulous design-by-ear experiments:

• Our thin copper conductors sound cleaner and have better bass and treble than thick conductors. Technically speaking, this is because thin wires have less signal-distorting “skin effect”, as is well understood by microwave engineers and physicists. Skin effect delays low frequency tones relative to high frequency tones, thus smearing the crisp attack and sustain of each note or chord. Our copper wire is 3 to 5 times thinner than conventional cable conductors, thereby delivering much lower skin effect and punchier, much more transparent tone.

• Since there is no such thing as a perfect insulator, all wire insulation absorbs or “steals” energy from the cable's electrical signal currents—thus compressing and smearing the sound of the instrument. Twice as much mass of insulation steals twice as much energy. Our ultra-thin insulation design has 10 to 20 times less mass than the thick plastic insulation used on conventional cables. That removes a major cause of dull, indistinct tone.

• The **quality** of our cable's conductor and insulator materials has a major effect in further enhancing the clarity and dynamics of your instrument's sound. The high purity copper wire we specify for our cable contains less than $1/10^{th}$ of the principal impurity found in the copper used by conventional cables. The energy absorption of any insulating material is measured by the dielectric absorption factor; our polypropylene and Teflon insulation's dielectric absorption is 15 times less than the cheap polyvinyl chloride (PVC) plastic that insulates almost all conventional instrument cables.

Why do engineers insist that thin cables can't possibly sound good?

Conventional electronic engineers—those who invariably reject listening tests as too “subjective”—are quick to assert that sine wave measurements are the indisputable scientific proof that thin cables must sound inferior to thick ones. But their alleged theory is invalid: their measurements are precise but irrelevant. Consistently disproven by rigorous listening tests, the conventional theory rests on two eighty year old measurement assumptions still taught in electronic engineering schools:

• First, that audio measurements based on sine wave test signals allegedly predict whether a loudspeaker, amplifier, microphone or cable sounds good or bad.

• Secondly, that capacitance (i.e. energy storage) and resistance supposedly are the only measurements important for predicting whether one cable sounds better or worse than another.

The conventional electronic engineering theory built on these two old assumptions claims that cables with high capacitance will sound dull with diminished, rolled off treble—and that cables with high resistance will sound thin with weakened bass.

So to lower the capacitance of their conventional cables, engineers design their cables with increased diameters (because the larger the separation between the cable's center conductor and its outer shield, the less the stored energy). To decrease the resistance of their cables, traditional engineers increase the thickness of their conductor wires.

This way, engineers can sell their thick cables by advertising impressive measurements from sine wave tests. But their theory only looks good on paper; it doesn't enhance your listening experience unless your care more about hearing sine waves rather than music.

The latest neurological research shows that the human brain's highly sophisticated processing of complex musical sounds means that testing with artificially smooth sine waves simply is not useful for predicting what sounds good to the ear.

Even worse, cables, loudspeakers, amplifiers and microphones respond entirely differently to the infinite complexity of real music test signals than to the synthesized smoothness of sine waves—as shown in thousands of published listening + measurement tests of audio equipment, tests in which the music listening results contradict the sine wave measurement predictions.

Without delving into the fascinating mathematical and physical details of why sine waves can never approximate the astonishing complexities of music tones or why real electronic components respond so differently to complex tones versus smooth sine waves, you can confirm for yourself the fallacy of the conventional engineer's predictions for cables by the following simple experiment:

• Borrow the thickest standard instrument cable you can find.

• If you have the right meters, measure the actual capacitance and resistance of both our thin cable and the conventional thick one. You will certainly find that the thicker cable has lower capacitance and lower resistance than our very thin ClearTone.

• Plug in your electric guitar or keyboard and play each cable for one minute. If possible, get a panel of listeners to participate in the experiment.

Beyond the shadow of a doubt, you and each listening panel member will agree that the thin ClearTone cable, with its “too high” capacitance and resistance, has satisfyingly better-sounding bass and treble—as well as better dynamics, clearer overtones and cleaner attacks.

In simple terms, so much for the cable predictions of conventional electrical engineers.