

# Accuracy

This white paper is an introduction to what you as a speaker builder should know concerning accuracy.

We have constructed an easy-to-duplicate methodology that will allow anyone to test the accuracy of their loudspeaker test system.

Accuracy is, simply put, obtaining the correct answer. In archery terms it is hitting the bullseye of a target.

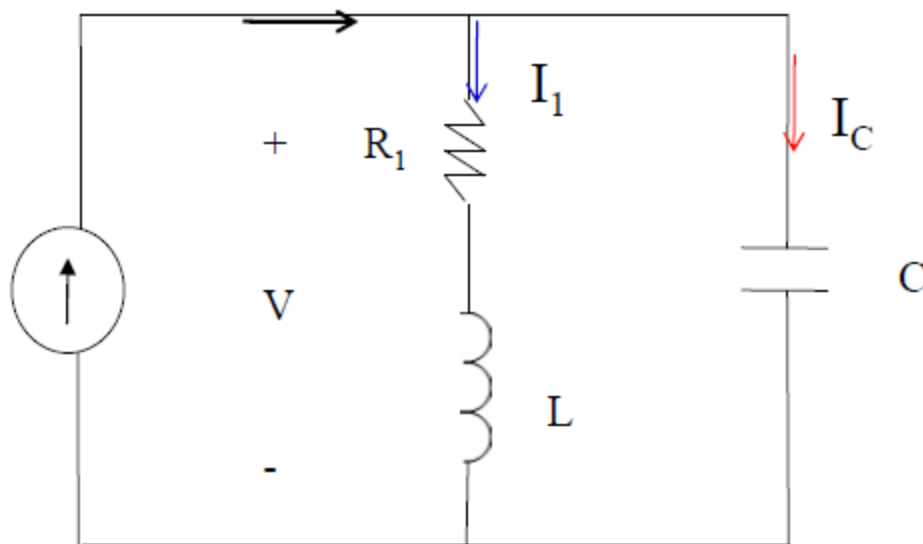
Precision is the ability to obtain the same answer over and over. In archery terms precision is grouping all of your arrows very close together.

A truly useful piece of test equipment must be precise and accurate. It is possible to be accurate by accident. That is why trials are performed; to insure that the accuracy of a system is repeatable.

When designing a piece of test equipment, precision is the first milestone to reach. Everything else hinges on precision. Once precision is obtained accuracy can be dialed in. You must design in precision.

So, now on to the how-to portion of this white paper.

All that is required are some banana plugs, an inductor and a capacitor. The circuit that is constructed is shown in Fig 1.



Practical Parallel RLC circuit

$R_l$  is the DC resistance of the inductor.  $L$  is the inductance of the inductor.  $C$  is the capacitance of the capacitor.

The resonant frequency ( $f_s$ ) of this circuit is

$$f_s = 1/(2 * \pi) * \sqrt{1/(L * C) - (R_l^2 / L^2)}$$

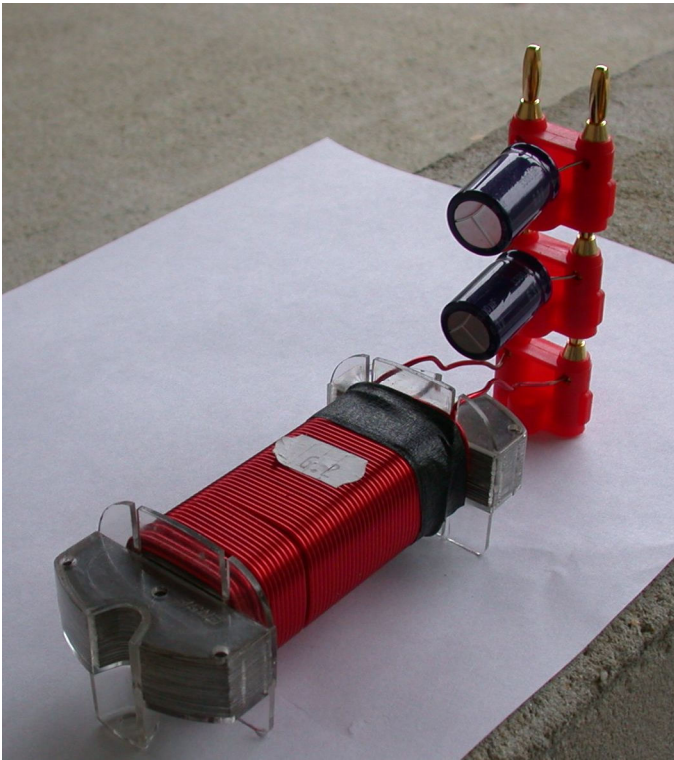
The  $Q_{ts}$  of this circuit is

$$Q_{ts} = 2 * \pi * f_s * R_l * C$$

For the circuit pictured below we selected an inductor with a nominal value of 6.2 mH. The actual measured inductance is 6.4 mH. The measured DC resistance of the inductor is 0.274 ohms.

We chose two 3300 uF capacitors in parallel. The actual measured capacitance of the parallel pair of capacitors is 6890 uF.

Photo 1 The tank circuit under test



The calculated  $f_s$  of the circuit is 22.978 Hz.

The calculated  $Q_{ts}$  of the circuit is 0.273

We performed 10 trials with our Smith and Larson Woofer Tester 2. We averaged the results of the 10 trials.

We obtained a measured  $f_s$  of 22.86 Hz. Our error is 0.5%

We obtained a measured  $Q_{ts}$  of 0.272. Our error is 0.2%

Our accuracy is better than 1%. The grouping of the measured results is very tight and, thus, very precise.

We believe that we make the most precise and most accurate loudspeaker test equipment that you can obtain at almost any cost. The price of a WT2 is amazingly affordable considering how precise and accurate the system is.

We welcome you to perform your own accuracy test of your WT2. If you own a competitive product we welcome you to test that system using the methodology described herein. If you decide to upgrade to our WT2 you can reach us at [www.woofertester.com](http://www.woofertester.com)