

SSIC

(Solid State Inductive Collapse)

Test 2

Three's company

by drak

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Test 2

This test is to find out if multi filer coils make a difference in cop. Since higher duty cycles seemed to have the lowest cop levels. I focused more on the lower duty cycles with smaller increases. I ran the tests from 5% to 45% using 5% increase per iteration. I only focused on air and ferrite because they seemed to win in cop from the last test. I'm also not going to add the voltage and joule charts because it takes time to include them here. The raw data is available on my site if you wish to review or make your own charts.

I also decided to only scan from 50 to 2500 hertz as it seems there wasn't much change in higher frequencies, and it decreases test time.

Coil – Quad filer (Four wires/coils on one coil), 26 gauge magnet wire, 800 turns

Coil1 – Input

Coil2,3,4 – Output

Input Cap – 25v 47000uF Electrolytic

Output Cap – 25v 47000uF Electrolytic

Circuit:

The circuit is the same as Test 1 except when hooking up an additional coil, I used a separate diode for each coil. Meaning three coils, three diodes. Two coils, two diodes. One coil, one diode.

Frequency scan test sequence:

S7 & S6 were closed for 6 seconds

Voltage readings were taken from both caps and recorded

S1 was pulsed at a specified duty load at X frequency for 40 secs

Voltage readings were taken from both caps again and recorded

X was raised by 50 hertz

Process was repeated 50 times

Quad filer - Air

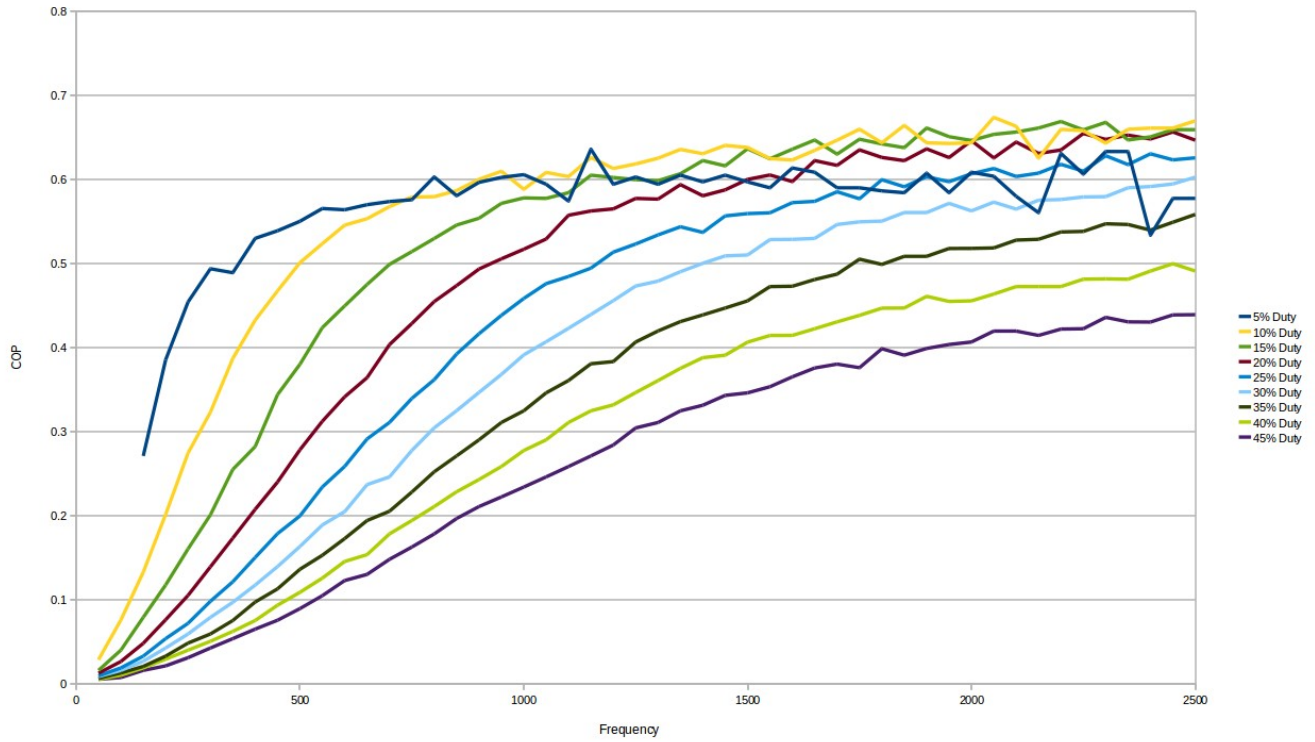
Number of coils - **One**

Duty cycle - 5%-45%

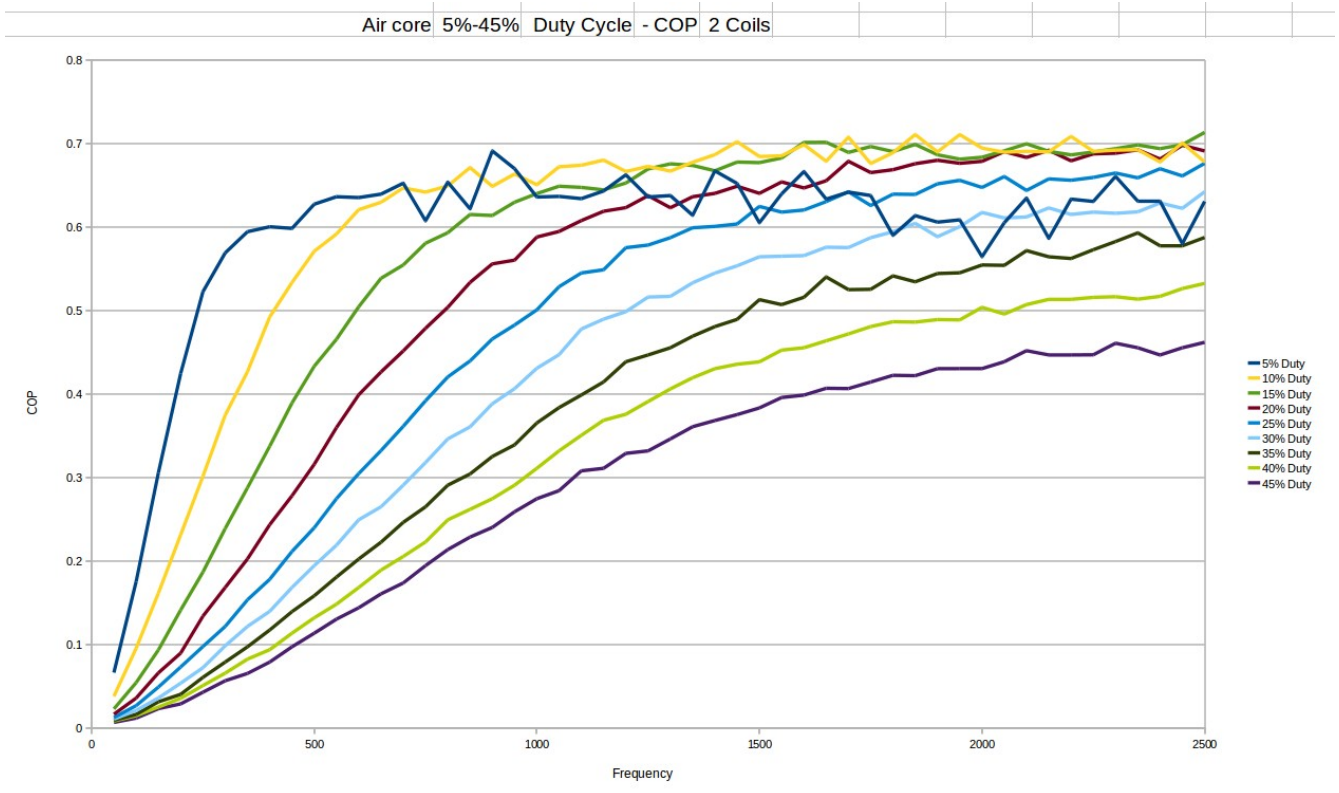
Frequency - 50hz - 2500hz

Core - Air

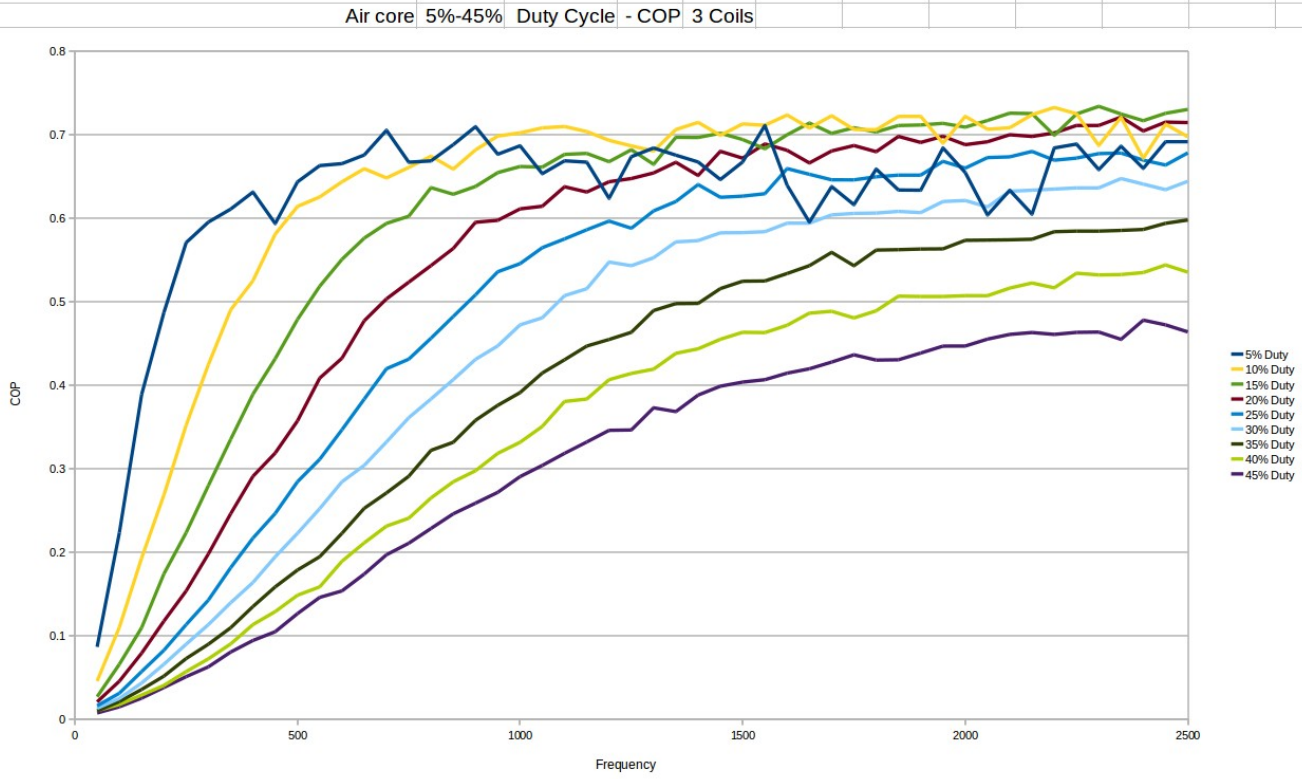
Air core 5%-45% Duty Cycle - COP 1 Coils



Number of coils - **Two**
Duty cycle – 5%-45%
Frequency - 50hz – 2500hz
Core – Air



Number of coils - **Three**
Duty cycle – 5%-45%
Frequency - 50hz – 2500hz
Core – Air

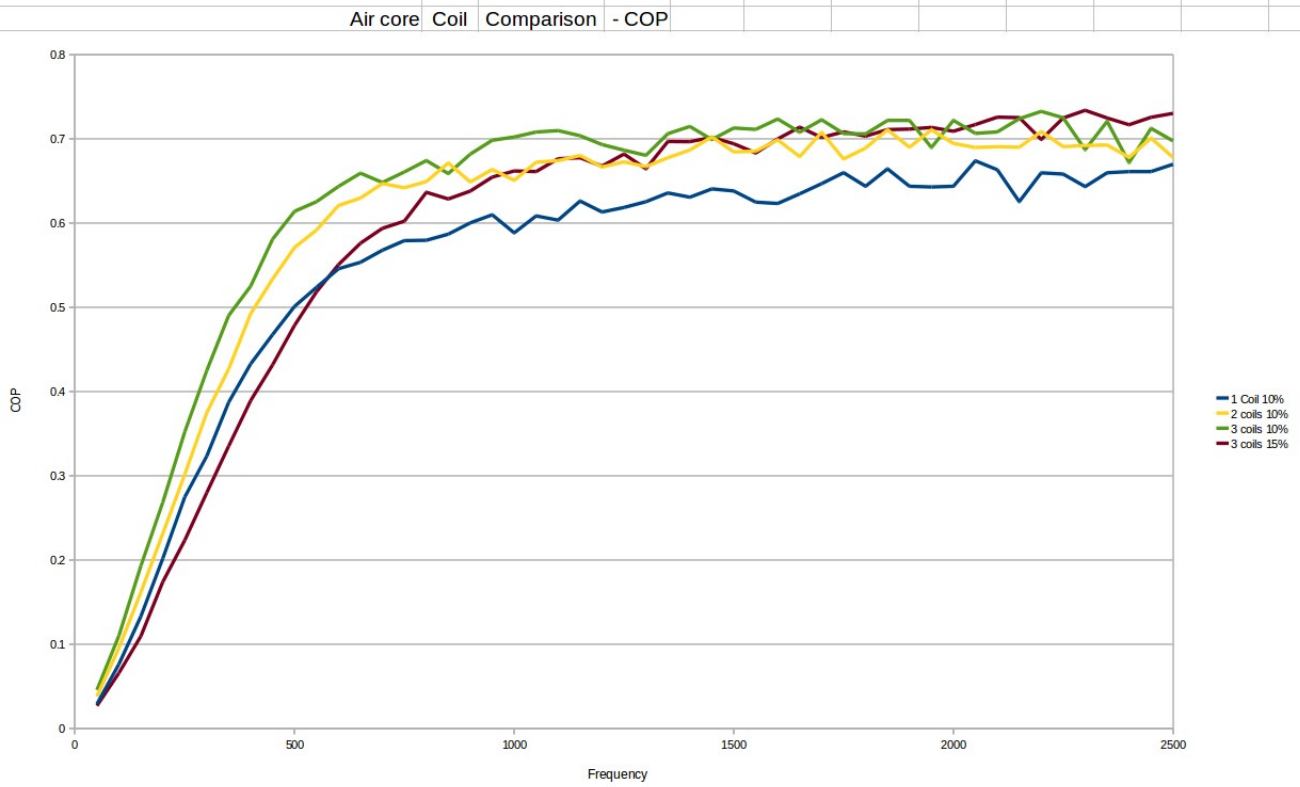


Number of coils – **Best of all coils**

Duty cycle – 5%-45%

Frequency - 50hz – 2500hz

Core – Air



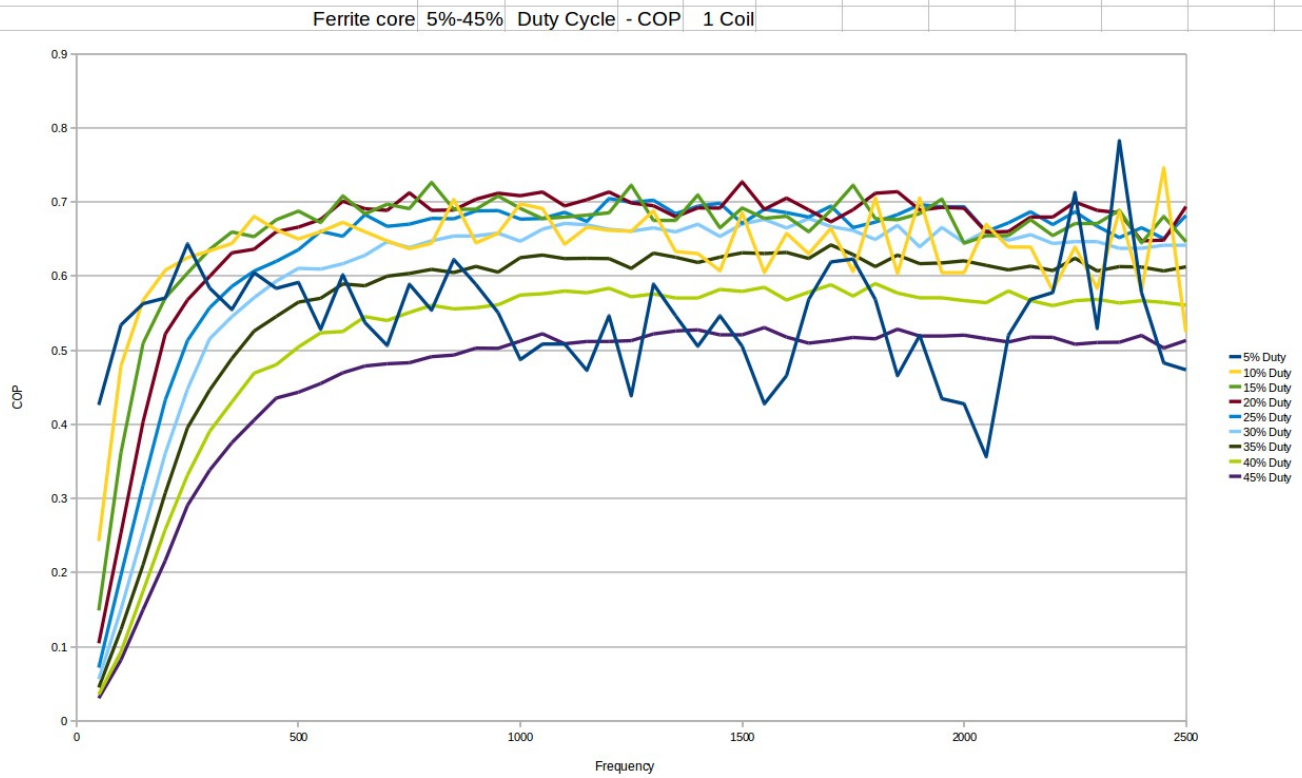
Quad filer - Ferrite

Number of coils – **One**

Duty cycle – 5%-45%

Frequency - 50hz – 2500hz

Core – Ferrite

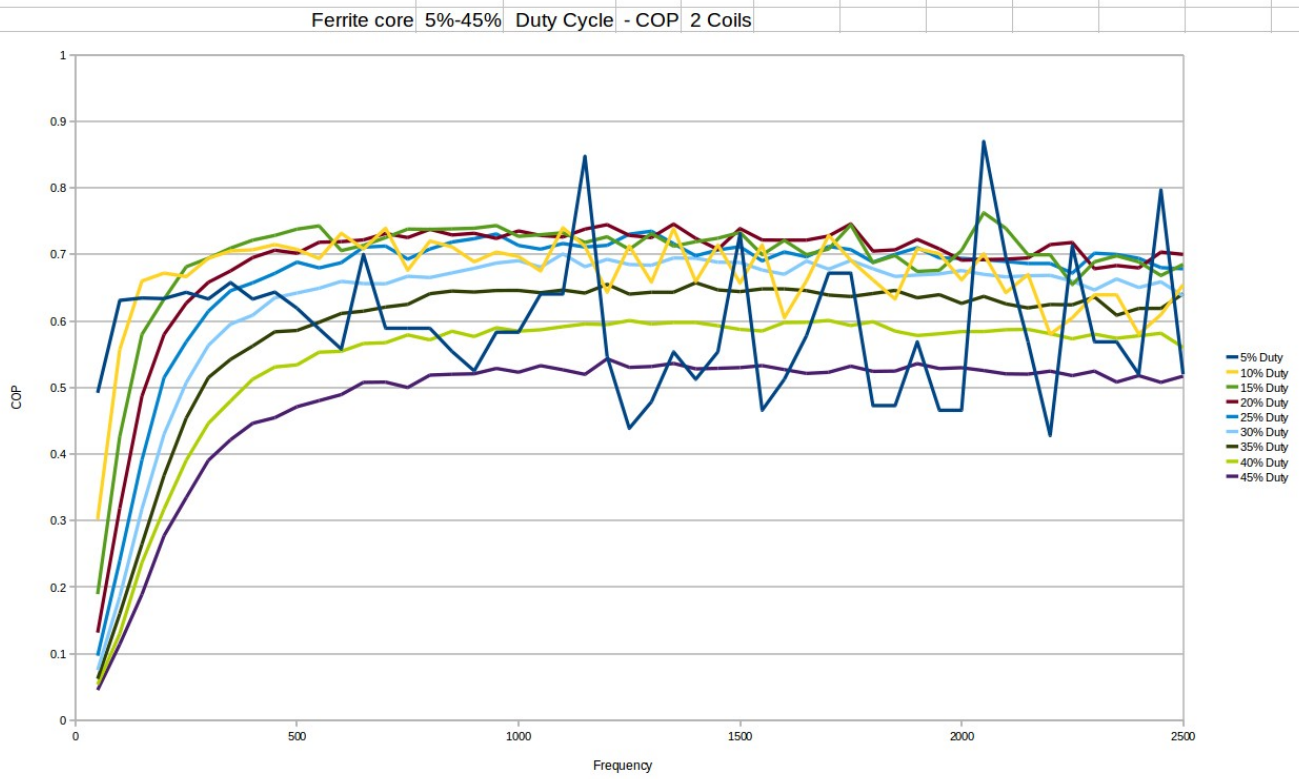


Number of coils – **Two**

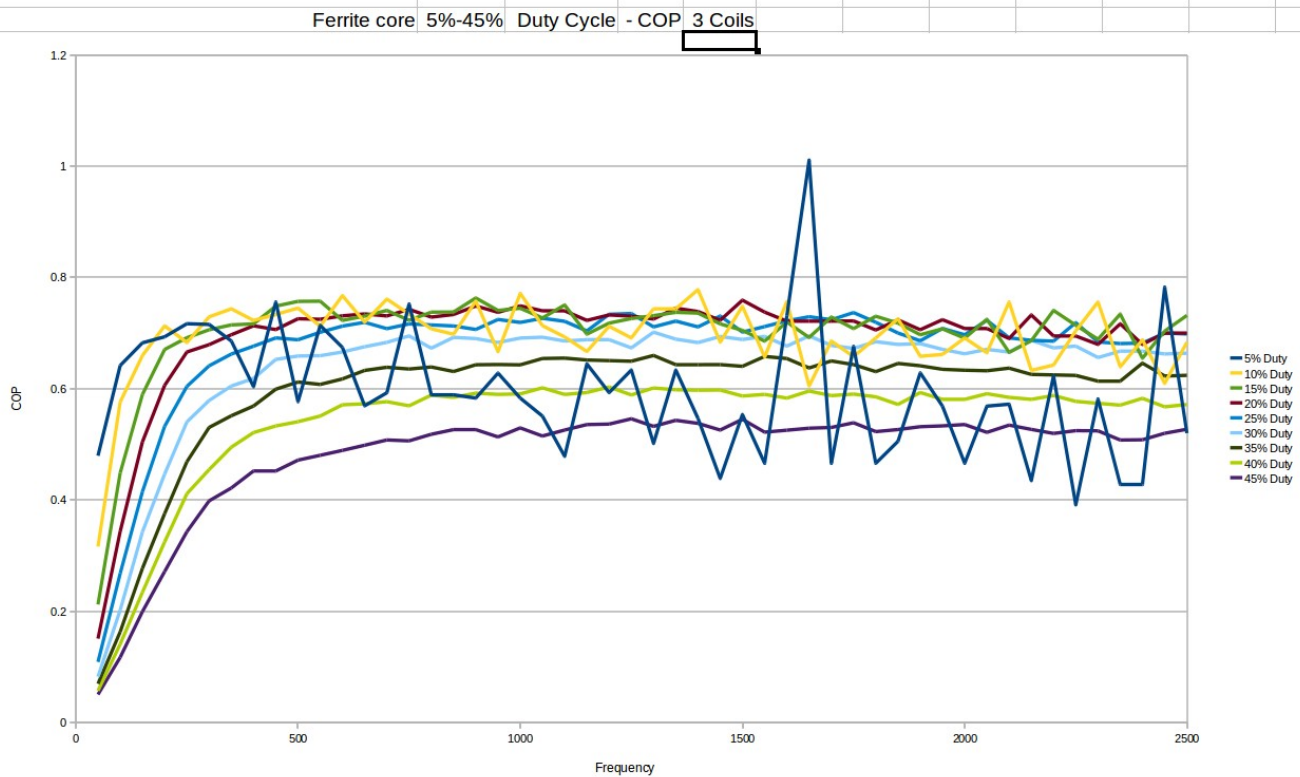
Duty cycle – 5%-45%

Frequency - 50hz – 2500hz

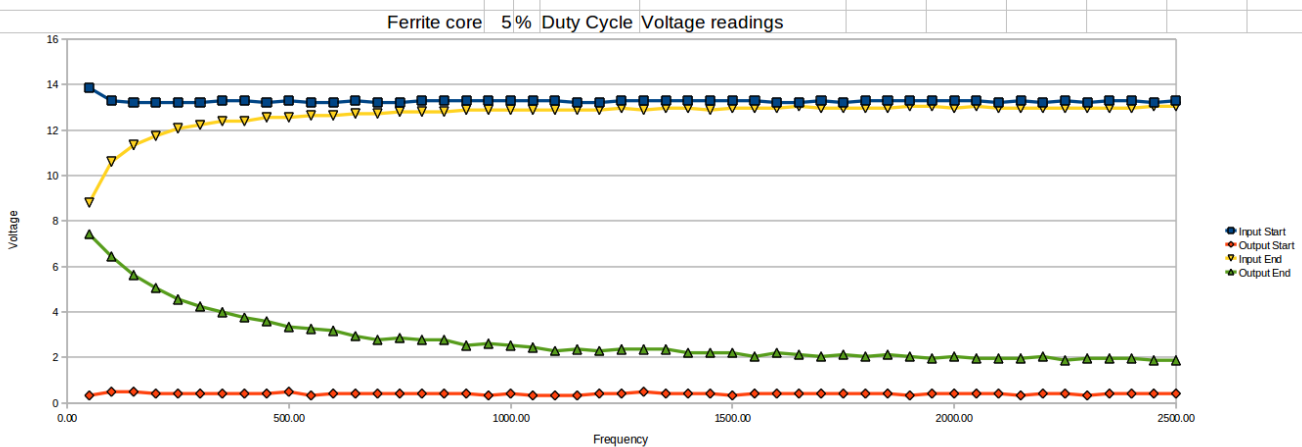
Core – Ferrite



Number of coils – **Three**
 Duty cycle – 5%-45%
 Frequency - 50hz – 2500hz
 Core – Ferrite



Please don't be fooled by this chart, it is NOT (cop > 1). The voltage test results of the 5% 3 coil run are here.



Notice the input end and input start three points after the 1500hz mark where the cop is shown greater then 1. The volt meter I'm using is a voltage divider from 80 volts down to 5 volts for an analog to digital input on a micro controller that uses a 10 bit resolution. Not much accuracy when dealing with such small voltage changes.

Also electrolytic caps tend to, on a smaller scale, act like a battery when being charged. If you charge it until it reaches a certain voltage then remove the charge, the cap will level off at a lower voltage unless the charge is kept there for a long time. Quickly charging a battery will do this. If you keep the charger on the battery longer, it will settle down at a higher voltage. I'm only using a 6 second charge time and also a 6 second dump time.

The same thing for discharging a cap. If you discharge it to 0 volts then let it set for a short period of time, it will seem to recharge a little bit.

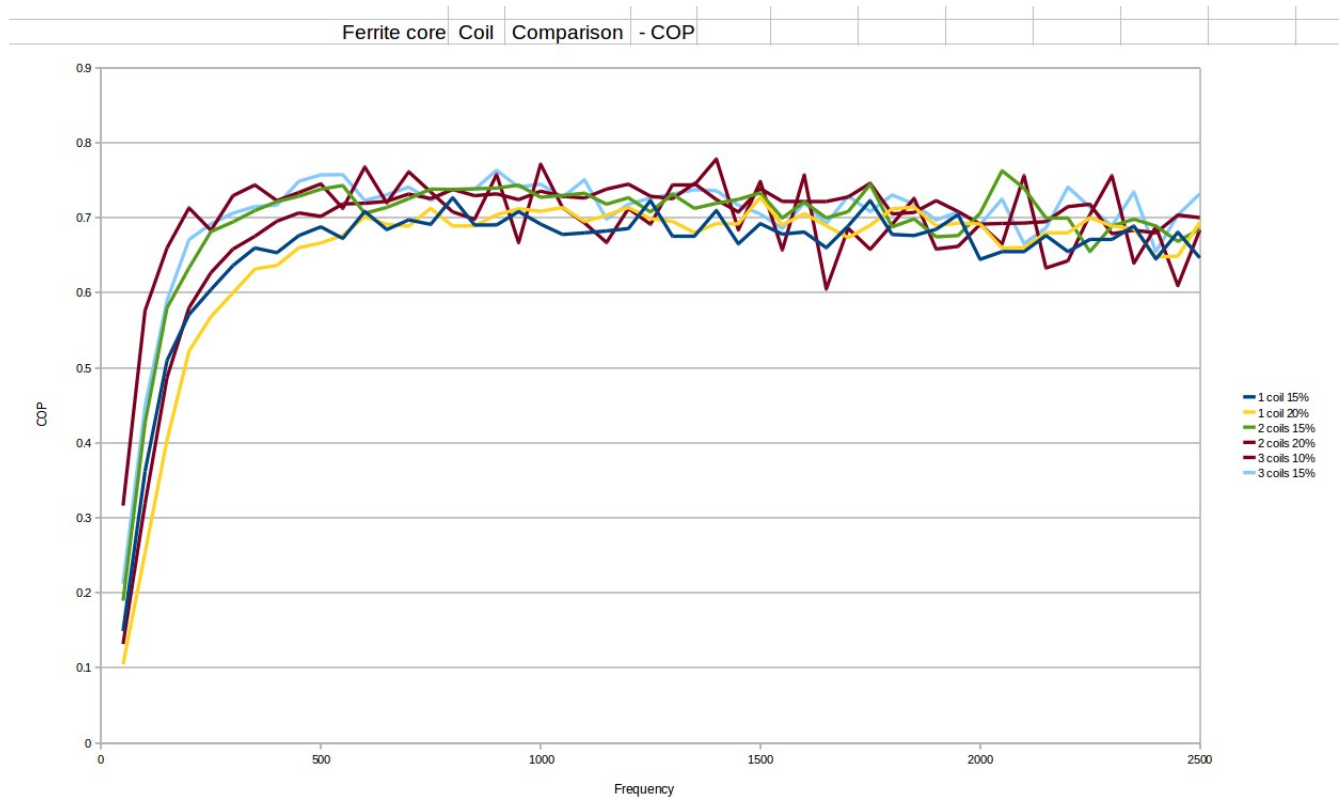
The 5% ferrite run was to sporadic to think that it achieved a cop over 1.

Number of coils – **Best of all coils**

Duty cycle – 5%-45%

Frequency - 50hz – 2500hz

Core – Ferrite



So....

the results show that multiple coils increase the cop, or do they??....

Maybe those extra coils are lowering the cop by being there if they are not being used, like dead weight. I wound another coil this time bi filer. One coil input and one coil output. Same number of turns, same gauge, same size bobbin. It was the same height but thinner. So, I also cut the coil height in half and wound yet another, this one as fat as the quad, but shorter.

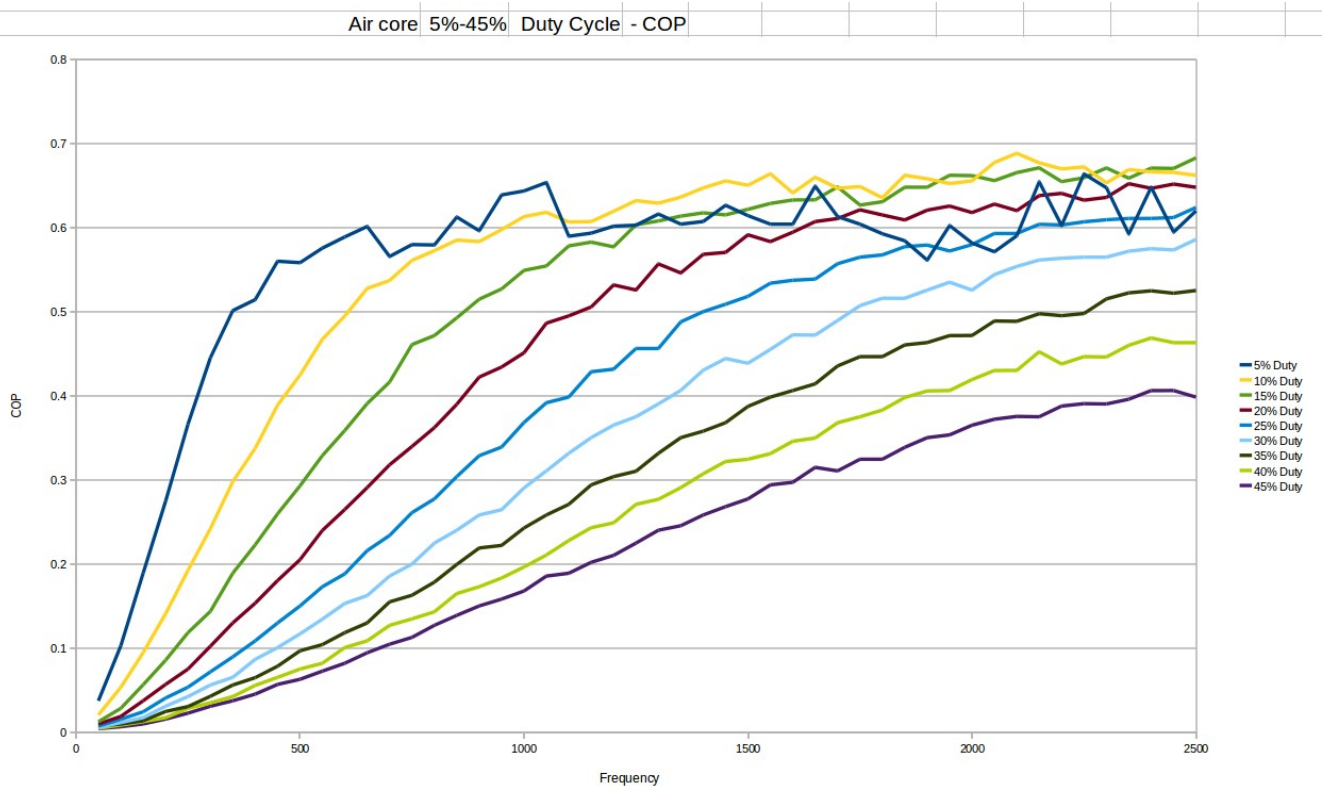


Bi filer – Air (Thin and Tall)

Duty cycle – 5%-45%

Frequency - 50hz – 2500hz

Core – Air

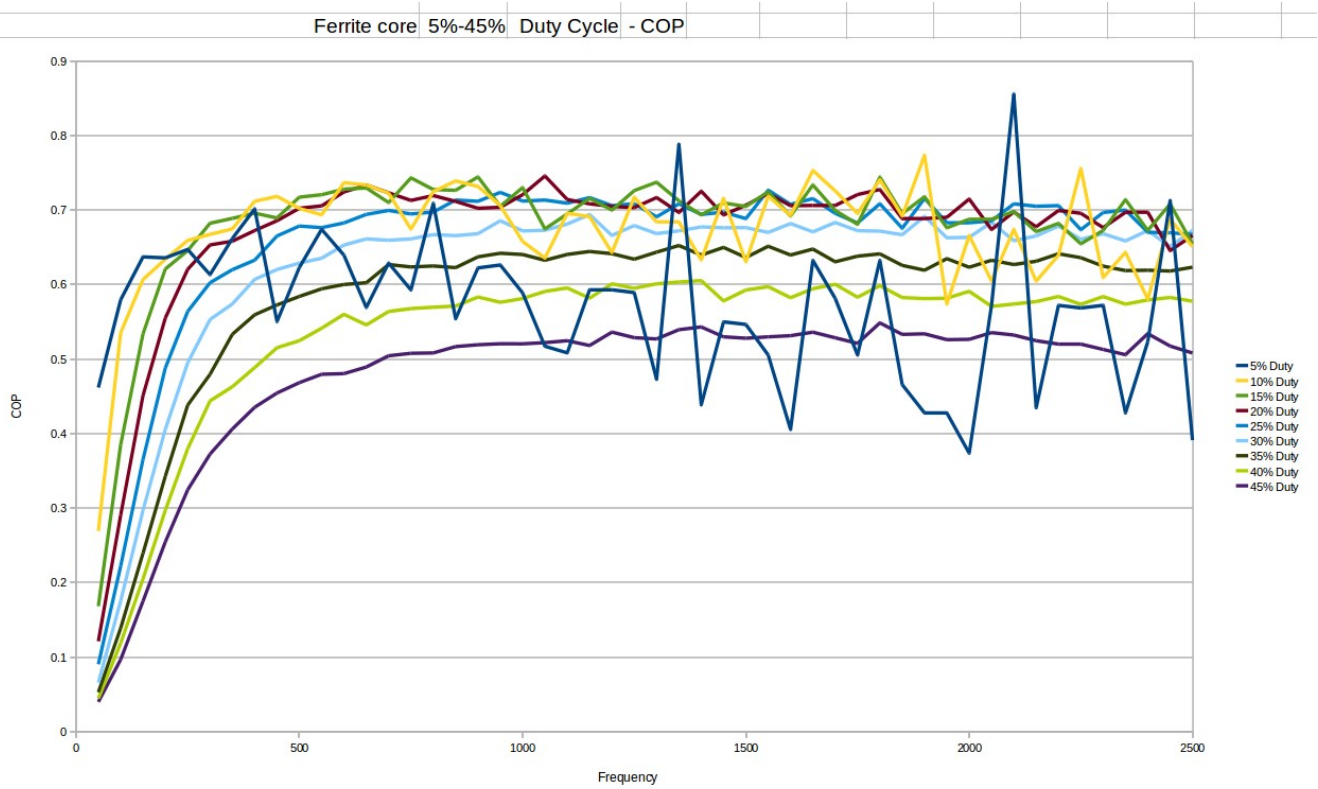


Bi filer – Ferrite (Thin and Tall)

Duty cycle – 5%-45%

Frequency - 50hz – 2500hz

Core – Ferrite

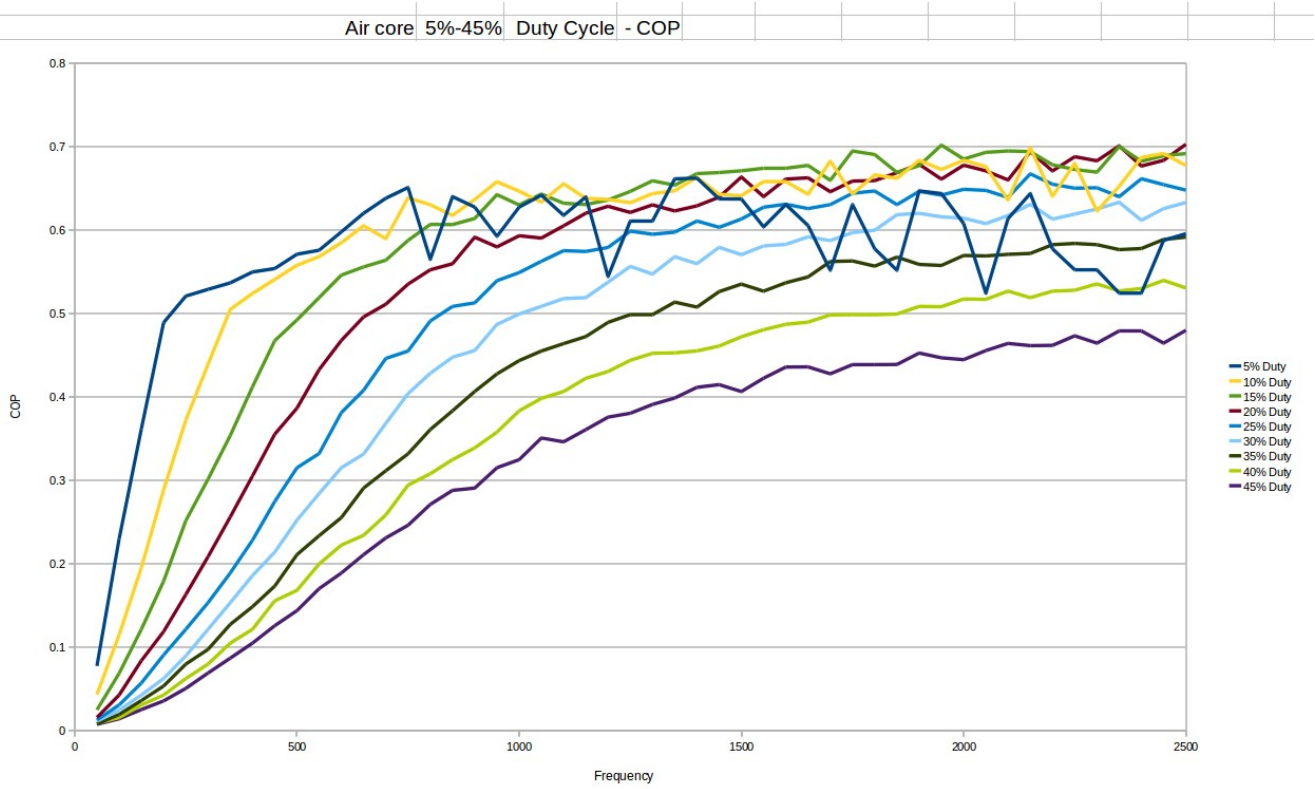


Bi filer – Air (Short and Fat)

Duty cycle – 5%-45%

Frequency - 50hz – 2500hz

Core – Air

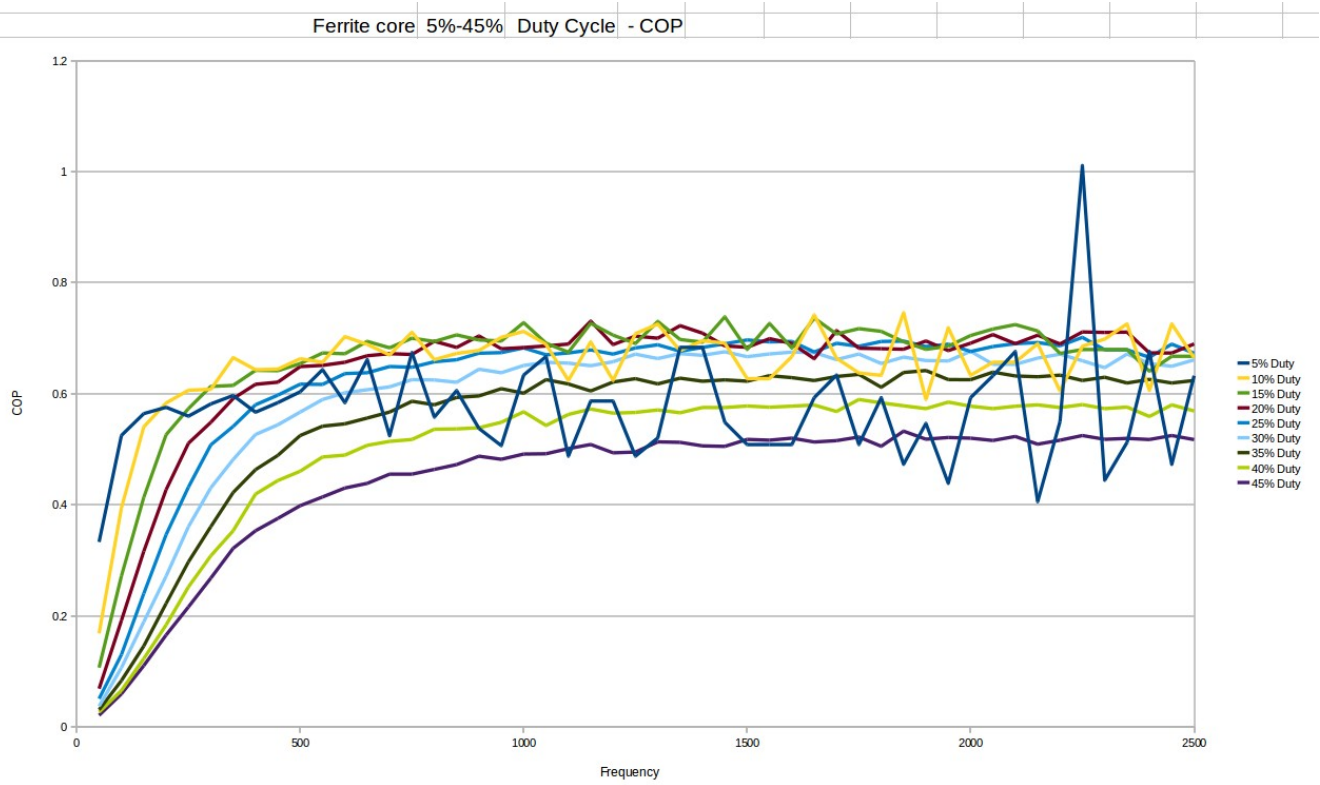


Bi filer – Ferrite (Short and Fat)

Duty cycle – 5%-45%

Frequency - 50hz – 2500hz

Core – Ferrite

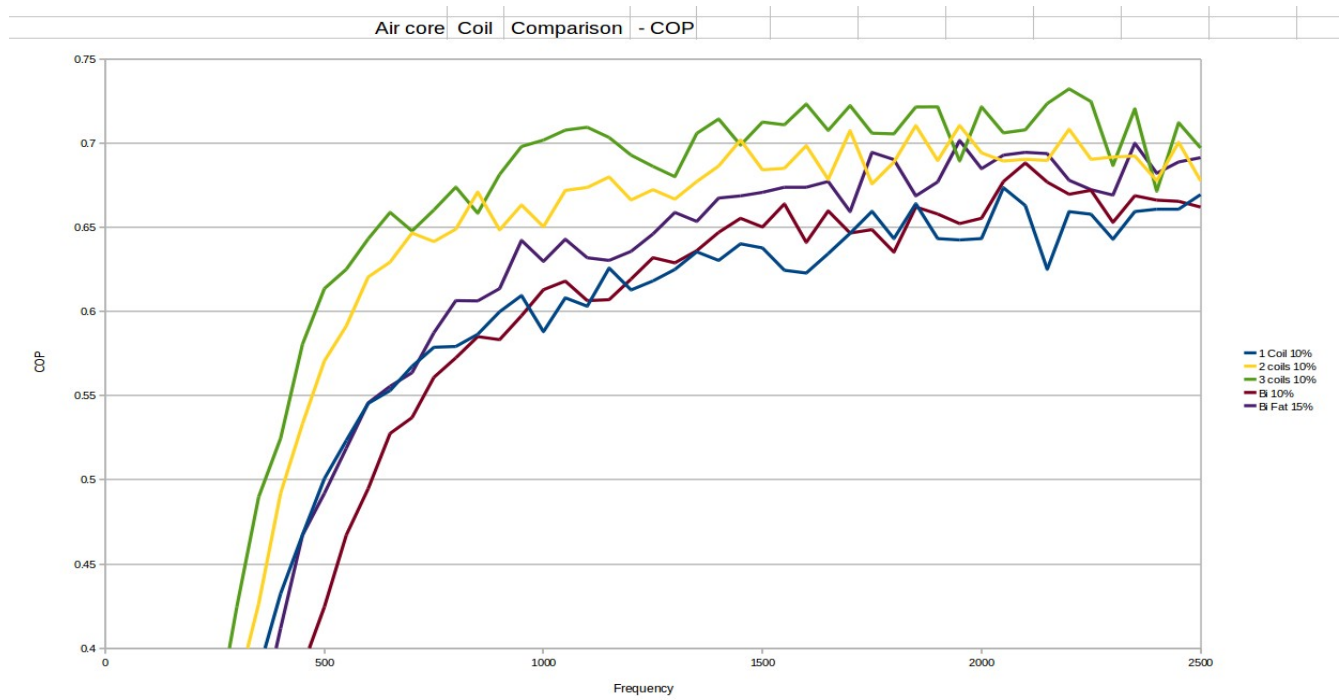


Best of All coils (AIR)

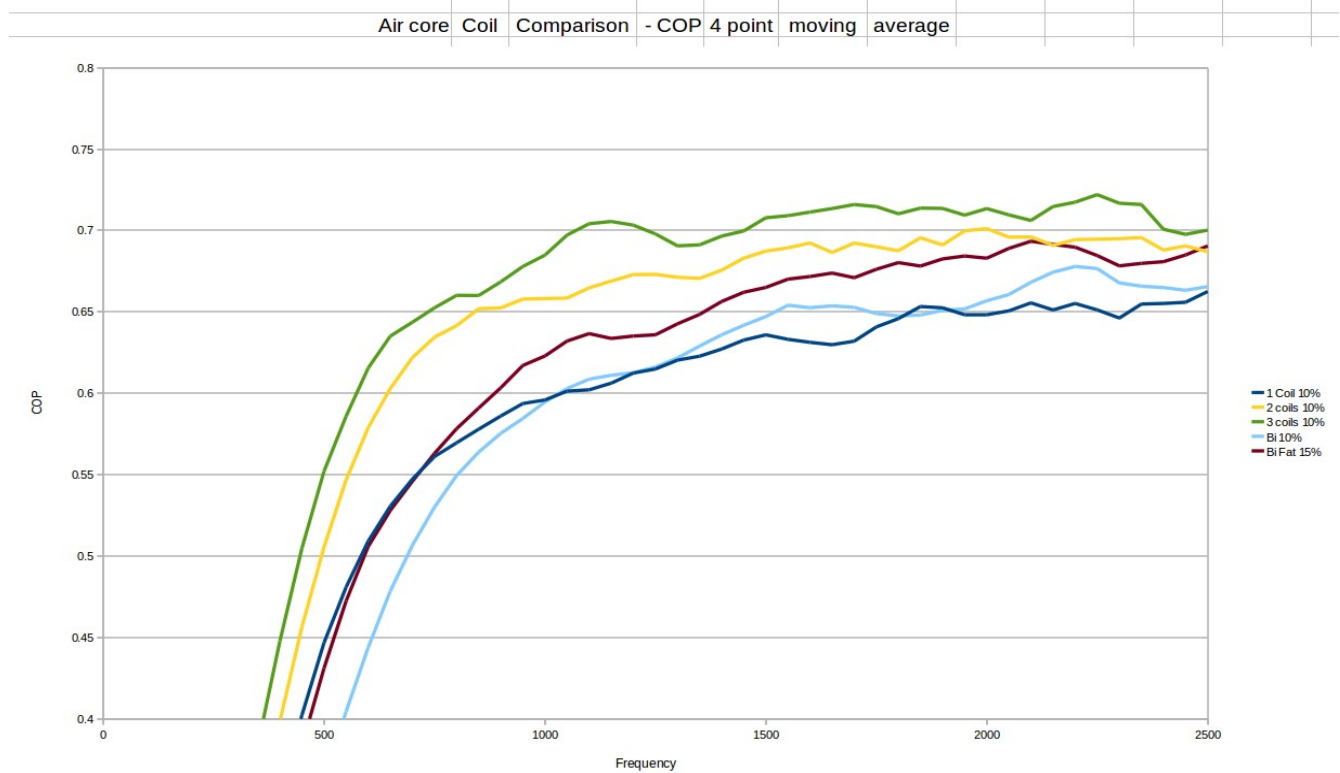
Duty cycle – 5%-45%

Frequency - 50hz – 2500hz

Core – Air



4 point moving average:

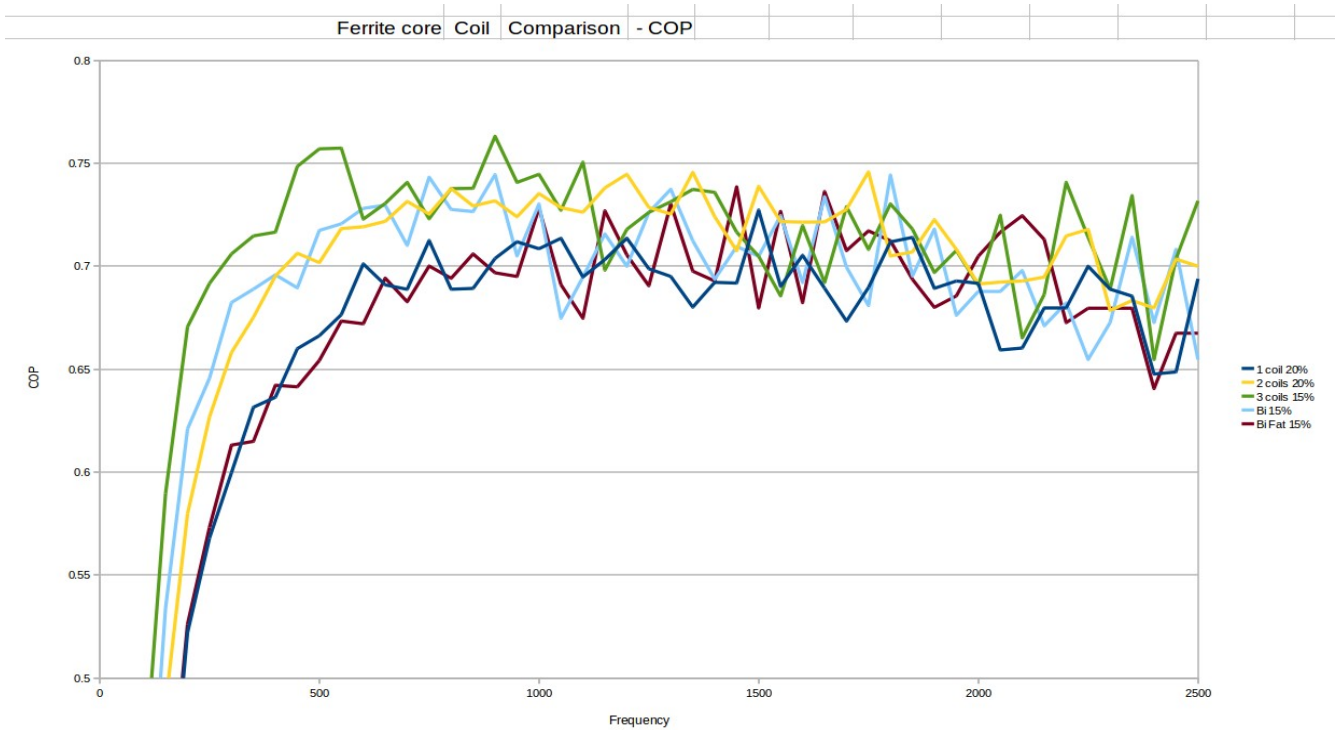


Best of All coils (FERRITE)

Duty cycle – 5%-45%

Frequency - 50hz – 2500hz

Core – Ferrite



4 point moving average:

