Traps with Toroidal Coils

In the range up to 150 Wtts RF Traps with toroid-coils are simple to build and to tune. A problem could be the parallel capacitor for high Voltage.

Experiments show in a load-test that a Voltage of 2-2,5 KV for the C is sufficient for proper working.

If you cannot get such capacitors you can use 4-5 C's with 500 V in series. In a test 3 x 100 pF/500 V in a 10-m-trap could handle 100 Wtts.

For the tests I used the toroid-types T94-6, T94-2 and T106-2. The table shows the calculated number of turns, in practice the real number is a little

bit lower (nice for tuning...).

The example shows a toroidal trap. 9 1/2 turns of 1,5-mm-CuL and 3
pF/500 V in series gives a renonant frequency of 28,4 MHz.

This trap handles 100 W RF, but better is a voltage of 2 - 2,5 KV for t
capacitor.

$$f = \frac{1}{2 \cdot \pi \cdot \sqrt{L \cdot C}}$$

For the calculating we need the ***Thomson-formula***

f (Frequency) in ***Hertz***, **L** (Inductance) in ***Henry***, **C** (Capacity) in ***Farad***

We need f in ***MHz***, L in ***uH*** and C in ***pF***

Here are the modified formula for our purposes:

$$f/\mathrm{MHz} = \frac{159}{\sqrt{L/\mu\mathrm{H} \cdot C/\mathrm{pF}}}$$

$$L/\mu\mathrm{H} = \frac{25\,330}{(f/\mathrm{MHz})^2 \cdot C/\mathrm{pF}}$$

$$C/\mathrm{pF} = \frac{25\,330}{(f/\mathrm{MHz})^2 \cdot L/\mu\mathrm{H}}.$$

$$N = 100 \cdot \sqrt{\frac{L/\mu\mathrm{H}}{A_L/(\mu\mathrm{H}/100\ \mathrm{Wdg.})}}.$$

The $\mathbf{A_L}$ is a specification of the toroid and gives the Inductance/100 turns in **uH** on the core.

N means the number of the turns.

The calculated number of turns for the Amateur-bands

Band	Inductivity	Capacity	Toroid	Turns	
10 m	0,95 uH	33 pF	T94-6 (yellow)	11	1,5-mm-CuL
12 m	0,78 uH	47 pF	T94-6 (yellow)	10	1,5-mm-CuL
15 m	1,2 uH	47 pF	T94-6 (yellow)	13	1,0-mm-CuL
17 m	1,65 uH	47 pF	T94-6 (yellow)	15	1,0-mm-CuL
20 m	1,85 uH	68 pF	T94-6 (yellow)	16	1,0-mm-CuL
30 m	2,47 uH	100 pF	T94-2 (red)	17,5	1,0-mm-CuL
40 m	5,1 uH	100 pF	T94-2 (red)	24,5	1,0-mm-CuL
80 m CW	10,05 uH	200 pF	T106-2 (red)	27	1,0-mm-CuL
80 m SSB	9,25 uH	200 pF	T106-2 (red)	26	1,0-mm-CuL

16 1/2 turns close spaced give an inductivity of 2,8 uH

16 1/2 turns wide spaced give an inductivity of 2,5 uH

The upper picture show how the inductivity can be influenced by changing the distance between the turns of the coil.
Closer turns give a higher inductivity, wider a lower. Tuning is no problem! But how can we measure the frequency of a toroidal trap? Look
the DK7ZB-method as described on the other page::


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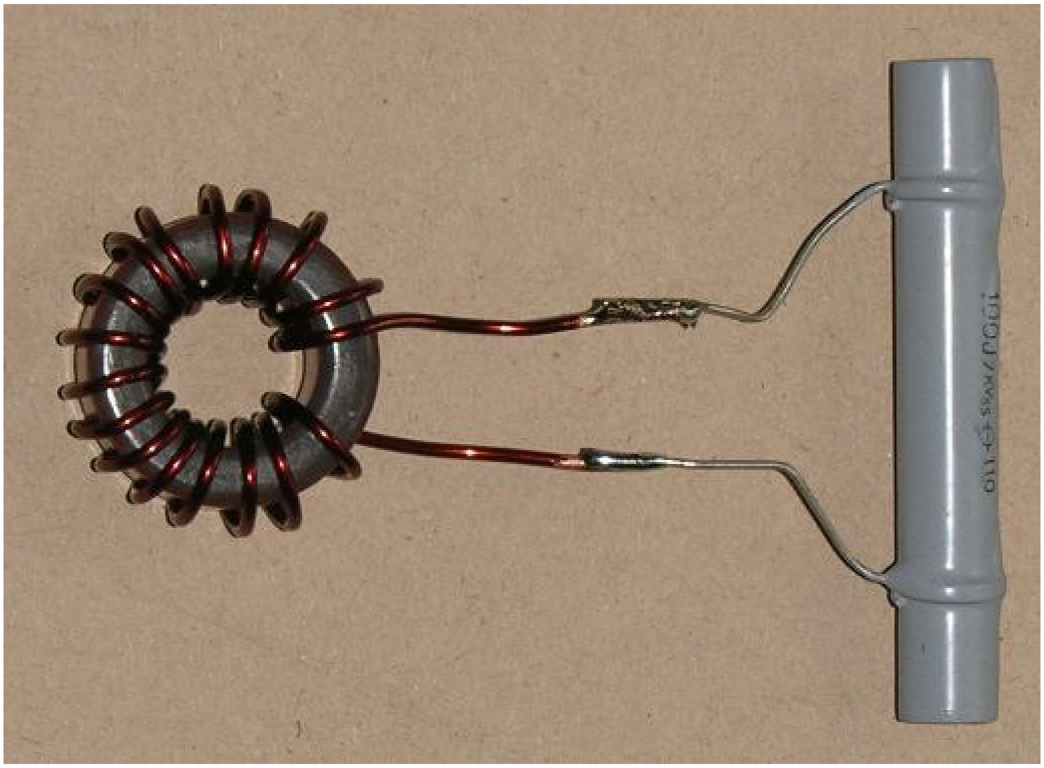

Here the complete trap for 10,12 MHz:

16 1/2 turns on a T96-2 (red) and a capacitor 100 pF, 7 KV