

Inductance of Toroidal Coils

The inductance of a toroid of N turns is given by $L = KN^2$ where K is a proportionality constant characteristic of the core. The value of K will depend on both the nature of the core material and the physical size. Values of K for a number of popular powdered-iron cores are given in Table 1.

As an example, the T50-2 core has $K = 5 \text{ nHt}^{-2}$ (nanoHenrys per turn squared). The inductance of a 25-turn winding on this core would be $L = 5 \times (25)^2 \text{ nanoHenrys} = 3125 \text{ nH} = 3.125 \text{ } \mu\text{H}$. All of the data in Table 1 was abstracted from the catalog of Amidon Associates.

Table 1

CORE TYPE	K, nHt^{-2}	USEFUL FREQUENCY RANGE	CORE TYPE	K, nHt^{-2}	USEFUL FREQUENCY RANGE
T30-2	4.3	0.5-30 MHz	T25-6	2.7	3-250 MHz
T50-2	5.0	"	T37-6	3.0	"
T68-2	5.7	"	T50-6	4.0	"
T80-2	5.5	"	T68-6	4.7	"
T94-2	8.4	"	T80-6	4.5	3-100 MHz
T106-2	13.5	"	T94-6	7.0	"
T130-2	11.0	"	T106-6	11.6	"
T184-2	24.0	"	T184-6	19.5	"
T200-2	12.0	"	T200-6	10.5	"