SOME NOTES ON FERRITE CORE IDENTIFICATION

Identifying Ferrite Cores

What you have to do to sort most ferrite cores is wind a few turns on the core, enough to get a reliable reading for the measurement device you are using, and then sweep frequency until X=R. Reactance equals resistance.

What you will find is various cores have X=R at certain frequencies, this is where the loss tangent and reactance cross, or the Q=1 frequency.

For example 73 Material X and R cross at around 2 MHz. 43 materials cross up in VHF.

If you are using an MFJ-259 try to do this with enough turns so that the R is 50-100 ohms at the crossing frequency. Keep the core RIGHT AT the connector!!!!

If you are looking at low mu powdered iron cores, then you can just measure inductance. Using just a few turns, maybe a half-dozen, look at the value of inductance and the slope of inductance with frequency. The Q will probably be too high to use reliably unless you have a professional instrument. You can calculate AL and try to match it to a core, but this is not very reliable because several different types have similar AL's.

Actually a very low ui core is difficult to sort out. High ui mixes are pretty easy.

From: Tom W8JI

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How To Find The Inductance Factor (AL) Of An Unknown Toroid

1 Wind 3 turns of wire on the unknown toroid
2 measure the Inductance in uH
3 Multiply the outcome by 1000
4 divide the outcome by the square of the windings (9)

From: PD7MAA

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Identifying Torrid Core Materials

The easiest way to identify most ferrite materials is to wind about four turns of wire through the core and then measure the lowest frequency at which the value of reactive impedance equal resistive impedance i.e. X=R. There will be some variation between different batches and sizes of materials. But if you can plot the results graphically you can easily identify the 'signature' of each material.

Here are my references for some common ferrite materials

FT240-77 - 0.74MHz	FT240-31 - 3.5MHz	FT100-33 - 7MHz	FT240-43 - 17MHz
FT240-K - 22MHz	FT240-52 - 31MHz	FT240-61 - 58MHz	

Iron powder has a slightly different 'signature' it usually has a very low resistive component, which peaks to a higher value near self-resonance. The more lossy the material the broader and lower value of resistive peak is apparent.

T200-52	40MHz	Lime Green/ Blue/Red) used in PC power supplies - moderate loss
T200-26	60MHz	Yellow & White used in PC switch mode power supplies - high loss
T200-2	60MHz	Dark Red used for HF tuned circuits (& Ruthoff Ununs) - high Q low loss
T200-1	70MHz	Blue colour not common - moderate loss
T200-6	100MHz	Yellow colour used for VHF tuned circuits - high Q low loss

From: https://g8jnj.webs.com/balunsandtuners.htm

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Finding Permeability - Indirect Method

The way I determine permeability (mu) is to kinda back into it by finding the Inductance Factor, AL first. I take the unknown core and wind 10 turns of wire onto it and measure its inductance with a LCR meter. Then I determine its value AL (uH per 100 turns) from the formula: AL = L x 10000/N(squared), where L = measured inductance for N turns.

Example: for a given FT-50 toroid with 10 turns, I measure 5.9uH. AL = 59000/100 = 590. Looking up specs for FT-50 ferrites, I find that FT-50-43 has a nominal AL = 520 with mu = 850. This apparently is a FT-50-43.

From: KQ6F

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Resistance Measurements May Help Identify Unknown Core Material

Question: Is the material a low resistivity Mn-Zn ferrite or is it a high resistivity Ni-Zn ferrite? This can be answered easily with a simple ohmmeter resistance measurement. This will be point-to-point resistance on the surface of the ferrite part, not actually bulk resistivity. Proceed as follows:

(a) Clean a small area on the part so the probes of the ohmmeter will make good electrical contact. Some cores are painted, coated with clear insulation, or oxide, which must be removed.
(b) Set the ohmmeter on the 1K ohms scale.
(C) Place the probe tips firmly on the ferrite part about 1/4 in. apart and read the meter.

If there is no reading the core is probably Ni-Zn ferrite material. Typical Mn-Zn ferrite cores will read anywhere from 1K to 1OOK ohms. If it is over 1OOK try the 10K range on the meter. An accurate reading is not necessary and not possible with this method because of variable ferrite surface conditions. The object is to make a preliminary sort and identification. Bulk resistivity of Mn-Zn ferrites ranges from 10 to 5000 ohm-cm, with the new high frequency power materials nearer the high end of the range. (K4ZAD Note: Powered iron measures very high also.)

A core which measures in the low resistance range should be used in applications for relatively low frequencies. Typical applications are switching power supply inductor or transformer, power line EMI filter, or any other application in the kilohertz or low megahertz range.

The Ni-Zn ferrites have very high bulk resistivity with a typical range between 1 x 106 and 1 x 108 ohm-cm. These will only register on the highest ranges of the ohmmeter, if at all. Typical applications are EMI filters, beads, RF chokes, RF transformers, baluns and antenna rods.

Excerpted and slightly edited from the book: Ferrite Applications by Alan K. Johnson

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