BALUN ---- WIND THIS WAY ?

Jerry Sevick has saved us countless hours of experimenting with the transmission line transformers. There's a lot of information to be learned from several sources and here is one tip. Just exactly what the characteristic impedance or surge impedance of these transmission line wires is certainly is a mystery. I've found this information to be pretty reliable:

Guanella (current) baluns seem to accommodate mismatches with less distress than the Ruthroff (voltage) type. Seldom do we actually match impedances exactly with no reactance so the ability to accommodate errors is important.

Winding with #14 or #16 ga wire that is tight together as a pair and space wound on a large toroid will yield close to 50 Ohms. Space wound means that there is a space between each pair equal to another pair or at least one wire width. In other words…. not terribly crowded.

However, when we add a Teflon sleeve for high-voltage protection the increased space filled with Teflon dielectric moves our impedance up to 150 Ohms which is ideal for a 1:4 balun or higher but not for a 1:1 balun and in particular when we expect the 1:1 balun to be used stepping down to 20 Ohms or so.

There are 2 solutions:

1. Use #18 or #20 ga wire and Teflon sleeving which is not good for operation above 100 Watts.
2. Use #14 or #16 ga wire with the heavy insulation --- pretty common. Then varnish dip the core several times in polyurethane varnish. There is fiberglass cloth tape available to help this step. The edges of ferrite cores may be extremely sharp but some more expensive cores have been tumbled to remove this. Wind the wire pairs tight and well spaced then dip the completed balun several times in polyurethane varnish. Heat the balun to 150 f. and have the varnish at room temperature. Bump the can to remove bubbles. After several dip cycles I like to complete the coating with some varnish that's been left open to thicken and it gives a heavy build.

I've never lost one of these transformers to arc-over but don't run >1KW for most operating.

Be careful of lead spacing when assembling in a case and use Teflon sleeving where necessary.

POWER ! I've noticed that some commercial antenna tuners have wound a balun on a stack of cores for high-power operation but the high power units of Sevick design seem to use a single core. I'm not sure why Ameritron uses a big stack of cores and wire too small to handle high power. Stacked cores appear to be unnecessary and are definite nuisance when assembling and encasing the final units.

Baluns built into commercial tuners tend to be the Ruthroff (voltage) type and typically are 1:4 ratio. This works fine to match the 200 – 400 Ohm balanced lines and loads.

CASES: Home Depot and Lowes have very nice weatherproof plastic cases in the electrical department. They come complete with gasket and the plastic is easy to drill and work with. Don't forget to carry a good healthy copper strip ground where it's applicable.

More cases can be made from PVC pipe and fittings. Round pipe is more aerodynamic when hanging way up in the air.