

Designing High Power Ferrite Transformers for HF

First the core must be designed for the voltage that will be applied to the winding. This can be done in two ways, increase the number of cores used or increase the number of turns used. Many of the transformers that I design use 4 cores, in 43 material, and have two legs of .500 brass tube with pc board end plates. The back endplate is solid and connects the tubes together (can be considered a center tap). The ferrite sleeves have a .560 ID and are about 1 inch long and are 1 inch in diameter. This type of construction has much better primary to secondary coupling than toroidal transformers because the secondary winding is inside the primary (near 100% coupling).

Since the ferrite companies cannot tell you how much power a core will handle the loss must be measured. I have found that this size core can handle a maximum of 2w/core. By resonating the 1 t, 4 core transformer at the frequency of interest and matching it to 50 ohms the total loss can be measured with a Bird wattmeter. Increase the measurement power to 8 watts (for 4 cores) and that will be 2w per core. Measure the voltage across the 4 cores with a scope or rf voltmeter and that will give you the voltage across 4 cores. If the voltage was 28 volts then one core would have 2w loss at 7v per core-turn

An important concept is core-turns and in my example 4 cores x 1t = 4 core turns. If you had a 5 turn primary the core-turns would be 20 and 140 volts across the primary would give a total core loss of 8 watts. Ferrite loss increases

