

ENERGY LOSS DUE TO EDDY CURRENT IN LINEAR TRANSFORMER DRIVER (LTD) CORES*

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Rigorous theory describing the physics of the eddy current generation exists only for ferromagnetic materials with rectangular hysteresis loop. In such materials, the eddy current is evenly distributed at the surface layer of the iron tape. The thickness of this layer during the remagnetizing process constantly increases from both sides (opposite current directions) of the tape and becomes equal to the half of the tape thickness when the core completely saturates. Because of this continuous increase of the thickness of the current carrying layer, the resistance R_C of the core with rectangular hysteresis loop continuously decreases during the entire length of the applied voltage pulse.

The LTD cores are wound with ET3425 iron tape. Their hysteresis loop is not rectangular. To define the resistance R_C and the corresponding energy losses in the cores it is necessary to precisely specify how the eddy current get distributed in a tape with an arbitrary shape hysteresis loop. The present paper is devoted to this problem.

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