

## Reduction of Eddy Current Losses in Multilayer Amorphous Alloys Cores with the Ribbons Surface Oxidation

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In this paper possibility of improvement of cross-layer resistivity in multilayer magnetic cores was studied. It is known, that amorphous alloys are only possible to be obtained in shape of very thin ribbons and nanowires. Due to their thickness, magnetic cores for transformers and other devices have to be made of many layers of ribbons [1]. They exhibit great magnetic properties such low hysteretic losses, high saturation induction and high magnetic permeability. Unfortunately their low resistivity causes high losses for frequencies higher than 50Hz mostly due to the eddy current phenomena. In this research ribbons surface was oxidised in order to increase multilayer impedance.

Amorphous alloys are usually made of steel with more than 50% of iron. Most common iron oxide is a rust, which can increase risk of pitting corrosion. To prevent that rust has to be reduced to FeO oxide.

Hysteresis loops of cores made of oxidised ribbons were compared with unoxidised ones for wide range of frequencies. Cross-layer resistivity was significantly improved.

- [1] R. Hasegawa, A.C. Lee, L.A. Lowdermilk, Amorphous alloy core distribution transformers, *Proceedings of the IEEE*, Vol.79, Issue 11, Nov 1991.