The Influence of Compressive Stresses on the Properties of Inductive Electronics Components

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The cores of electronic components are an important element of these devices. These are usually inductors, transformers or electromagnets, usually used as wounded ring cores made of metaloxide ceramic. The quality, precision and stability of the entire device depends mostly on the cores' parameters. Their characteristics may be influenced by a lot of factors, such as temperature, humidity and stresses. The strains can have two sources: its own internal stresses and external forces. Internal stresses are associated with the manufacturing process, mostly caused by the residual stresses in the core or winding core too tightly, and should be eliminated during the production of cores. On the other hand, external stresses can occur due to improper installation, or other incidental factors which apply a strength to the core.

The most important thing, from the users and constructors the point of view, is the knowledge about the stresses' effects on the properties of the magnetic cores of an electronic component. The impact on the ferrites in the form of frame cores has been previously reported [1]. However, so far no research have confirmed a clear impact of stresses on the ring-shaped core. The results of such research will be presented in the paper. The tests will be conducted in a way which will take ensure both the uniformity of stress distribution in the core as well as closed magnetic path. This methodology has been described for amorphous cores ring in previous publications [2], and will be adjusted to the ceramic ferrite cores tests.

[1] A. Bienkowski, R. Szewczyk, The dependence of the magnetoelastic properties of Zn-Mn ferrites on their magnetocrystalline properties, *Physica Status Solidi A - Applied Research* **189**(3) (2002) 825-828.
[2] A. Bienkowski, R. Szewczyk, New possibility of utilizing amorphous ring cores as stress sensor, *Physica Status Solidi A - Applied Research* **189**(3) (2002) 787-790.