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## Waveform conditioning problems in high frequency magnetization of nanocrystalline alloys

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As a new kind of magnetic material, nano-crystalline alloys have high permeability and excellent loss characteristics, and measurement of high frequency magnetic properties of nano-crystalline alloys have great significance on the development of high frequency and high power density transformer. Since the permeability is very high, not only the external field even with small values but also the annealing process would influence the measurement results. If there exist asymmetric stress inside the materials, the magnetic field  $H$  can be asymmetric at different flux density levels. In this paper, three topics are mainly discussed: First, the problem of asymmetric distortion of the waveform in the nano-crystalline alloy high-frequency measuring is discussed and analyzed. Second, a newly developed testing system by adding a compensation winding is introduced. By applying this configuration, the dc bias magnetic field  $H_0$  can be adjusted to zero. Third, when the nano-crystalline alloy is nearly saturated, the flux density waveform starts to distort, a feedback control method based on the circuit model is proposed to keep the flux density  $B$  sinusoidal which is very important to calculate the specific losses during the magnetization. Finally, a FT-3KM nano-crystalline sample was measured and analyzed up to 10kHz. The losses are calculated by the field-metric method.

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