Measurement Technologies for Comprehensive Characterisation of Soft Magnetic Materials Used in Automotive Applications

Lukasz Mierczak
Dr. Brockhaus Messtechnik GmbH & Co. KG
Gustav-Adolf-Straße 4
58507 Lüdenscheid
Nordrhein-Westfalen

***Abstract*— Residual stress and high complexity of the dynamic magnetization conditions significantly influence magnetic properties of soft magnetic sheets used in automotive applications. The residual stress remaining in the motor laminations after manufacturing processes, such as stamping, stacking and housing shrink fitting, has a detrimental effect on power loss and permeability of stator and rotor cores resulting in reduced efficiency and impaired performance. Moreover, the rotational and non-sinusoidal dynamic magnetization increase the loss in laminated stator stacks which can be considerably higher than under standard sinusoidal excitation. Therefore, Brockhaus Measurements developed a wide range of measurement technologies for comprehensive characterization of magnetic properties of electric motor sheets. In this presentation the experimental data obtained with Brockhaus measurement systems for demonstrating impact of manufacturing and complex magnetization conditions on properties of stator and rotor magnetic laminations will be discussed.**

Keywords—measurement technologies, magnetic materials, power loss, permeability, electric motors