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**Effect of the interdependence of cold-rolling strategies and subsequent punching on the magnetic properties of electrical steel sheets**

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**ABSTRACT**

Non-grain-oriented electrical steels are major components of rotating electrical machines. The high silicon content of such steels results in a ferrite microstructure over the complete manufacturing process. Therefore, the whole process chain has an impact on the microstructure evolution e.g. grain size and texture which determine the electromagnetic properties. Thus, it is of interest to optimize the complete manufacturing process towards lower iron-loss or other physical properties.

In this paper, the effect of different cold-rolling strategies, annealing treatments as well as sheet metal blanking is studied regarding the microstructure evolution and resulting electromagnetic properties. Hot-band samples are cold-rolled and annealed differently in order to produce distinct samples of electrical steel sheets of the same thickness. Then the magnetic and microstructural properties of the different sheets are analyzed. The samples are processed afterwards in order to study the deterioration of the magnetic properties after shear cutting. Comparative measurements of the altered samples are conducted and analyzed.

The full paper will present the experimental setup in detail. Characteristic parameters which describe the cold-rolling strategies, the annealing process and the subsequent shear cutting process will be presented. Measurement data will be given and analyzed for the connection between the production process and the magnetic properties.