



## Evaluation of mechanical properties influenced by the formation of undesirable phases in the aging of steel used in three-phase induction motors

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The materials exhibit mechanical and electromagnetic properties. Therefore, they are of great technological interest and are used in many electromechanical devices, such as motors. The three-phase induction motor (TIM) is widely used due to its simple construction, mechanical resistance and good operating characteristics. In the steels used in the manufacture of the motors, a factor that must be taken into consideration is the lifetime of this electromechanical device, since the formation of carbides is detrimental to mechanical resistance, as well as the reduction in the value of its magnetic properties. Thus, taking into account the formation of carbides and undesirable phases in the lifespan of TIM, the present scientific initiation project proposes the analysis of the microstructure and mechanical properties of an electric steel taken from a TIM to assess the influence of the thermal treatment of decarburization in the electrical and magnetic properties of steel. The magnetic core of a three-phase cage-style induction motor will be used, composed of non-oriented grain steel sheets, with a long service life and which has already been considered with low performance. This magnetic core will undergo metallographic analysis, annealing heat treatment, analysis of mechanical properties and measurement of Vickers microhardness and all data obtained will be analyzed statistically. This research is expected to contribute to the study of this ferrous alloy, elucidating how the formation of undesirable phases can directly impact its microstructural changes and, consequently, its mechanical and magnetic properties. In addition, the study of this material may encourage further research and contributions to the knowledge of this alloy and its relationship between structure and mechanical properties for the Engineering area and for application in different segments of society.

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