

Improved Soft Magnetic Properties of Iron Powder Compacts Prepared by Mechanical Treatment of Powder Particles

Robert Maciaszek^{1, a)}, Peter Kollár^{1, b)}, Martin Tkáč^{1, c)}, Tetiana Rudeichuk^{2, d)},
Mária Fáberová^{3, e)} and Róbert Džunda^{3, f)}

¹ *Institute of Physics, Faculty of Science, Pavol Jozef Šafárik University in Košice, Park Angelinum 9, 04154 Košice, Slovakia*

² *Institute of Manufacturing Management, Faculty of Manufacturing Technologies, Technical University of Košice, Bayerova 1, 08001 Prešov, Slovakia*

³ *Institute of Materials Research, Slovak Academy of Sciences, Watsonova 47, 04001 Košice, Slovakia*

^{a)} *Corresponding author: robert.maciaszek@student.upjs.sk*

^{b)} *peter.kollar@upjs.sk, ^{c)} martin.tkac@student.upjs.sk, ^{d)} tetiana.rudeichuk@tuke.sk, ^{e)} mfaberova@saske.sk, ^{f)} rdzunda@saske.sk*

Abstract. Soft magnetic compacts and composites are an important group of soft magnetic materials prepared by powder metallurgy methods. Although they have been known to researchers and manufacturers for over a century, emerging new technologies continue to enable their development. The study of the influence of imperfections in the shape of particles has proved that they have a substantial impact on the mechanical properties of the final product. Rough surfaces also present an obstacle to the displacement of domain walls in ferromagnets. This paper describes the effect of the process of mechanical surface treatment of powder particles on the magnetic properties of the resulting compact. The conclusions are based on the study of four samples formed from iron-based powders that have been subjected to a treatment process designed to smooth the surface and reduce impurities.