

## The Effect of Using Iron Based Powder on Frictional Area of Machine Elements<sup>1</sup>

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### Abstract

Frictional wear and erosion in textile machines is a prime problem that the industry is increasingly facing. This resulted in a huge and complicated scientific and technological process for designing special machine elements that can withstand harsh working conditions of high erosion, friction, temperature and chemical effects.

New trend in designing and developing machines is based on new technological solutions in manufacturing that satisfy the technological requirements as increasing machine life, minimizing friction wear, increasing productivity, quality and minimizing manufacturing time. Powder metallurgy is an essential technology that is increasingly used in industry for such purposes.

The presented work dealt with methods of producing metal powders of sizes ranging between 0.01 – 2000 micrometers depending on the requirements, and also dealt with compaction technology used to obtain a sustainable products in terms of geometry, strength and accuracy. And finally used, is the sintering technology in furnaces and different heating programs and sequences, were studied in order to achieve the optimum program for the required mechanical and chemical quality.

<sup>1</sup> For paper in Arabic see Pages (185-211).

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The study shows that the effect of Graphite on the mechanical characteristics is explained by increasing brittleness of the product due to the increasing contents of cementete within the structure of the medium. However, mechanical strength and hardness increases up to 0.5% while brittleness increases, after this percentage the improvment of mechanical charctiristics is very slow while the speciment becomes unusably very brittle.

Hardness increases gradually with the increase of Chrome content. However, strength of the speciment increases with the chrome up till 2% but between 2-4 % of chrome the strength increase is very slow. With increasing the chrome percentage up to 6% the strngth start to increase dramatically due to the generation of chrome carbides. Chrome highly increases the frictional wear resistans, in addition to the increase of chemical resistance, where, exposing speciments to a very active chemical medium for 168 hours after adding gradually chrome led to a reduction on the chemical wear.