

High temperature sintering of low alloy steels: effect on shrinkage and dimensional stability

D. Toledo (University of Trento – Italy), I. Cristofolini (University of Trento – Italy), A. Molinari (University of Trento – Italy), V. Arnhold (Powder Metallurgy Solutions – Germany), V. Kruzhanov (PM Consulting – Germany), P. Vervoort (Eisenmann Thermal Solutions GmbH – Germany), M. Dougan (Ames - Spain), L. Wimbert (Hoeganaes Corporation – Germany), V. Bonnefoy (Sintertech – France), R. Hellein (Miba Sinter Group – Austria), H. Weber (Riedhammer GmbH – Germany), F. Baumgärtner (Schunk Sintermetalltechnik – Germany), M. Fernandez (PMG Holding GmbH – Germany), C. Larsson (Höganäs AB – Sweden), M. Schneider (GKN SinterMetals – Germany)

Abstract - The influence of high temperature sintering on the dimensional stability and the microstructural and mechanical properties of some low alloyed steels were investigated in the EPMA Club Project “HTS”. The materials investigated were five different powders: Ancorsteel 4300 and FeSiVC (Hoeganaes Corporation grades), AstaloyCrM, AstaloyCrA+2%Ni and DistaloyAE (Höganäs grades). Rings (55 mm external diameter, 45 mm internal diameter, 5 mm height) were cold compacted and sintered at the standard temperature of 1120°C and at high temperature in the 1180-1260°C range in different continuous furnaces. The whole manufacturing process was carried out in industrial plants. In spite of the larger shrinkage than at 1120°C, high temperature sintering does not impair the dimensional precision and stability of the rings. HTS processing widens the possibilities for new alloy systems in industrial applications with opportunities to reduce cost and achieve improvements related to processing (REACH).

Keywords: high sintering temperature; dimensional control