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Valve seat insert: air quenching and characterization of components obtained with AISI M3:2 high-speed steel

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The development of components ecologically correct is something more and more necessary. The first development of valve seat inserts (VSI) take in account the use of cobalt and lead in its chemical composition. Such elements are avoided in the current applications due to its high cost and toxicological effects, respectively. In the present work was used VSI developed with a new chemical composition. The aim of this work were to air quench and characterize such components. The studied VSI were obtained with AISI M3:2 high-speed steel admixed with iron powder and another additives such as manganese sulphide, graphite, zinc stearate and carbides. All the air quenched VSI were double tempered, for one hour each, at seven equidistant temperature from 100 °C until 700 °C. The air quenched components had its mechanical and physical properties determined by means of its apparent density, apparent hardness and crush radial strength. The chemical composition was measured through the gases analyses and energy dispersive X-ray fluorescence spectrometry techniques. Microstructural and phase characterizations were performed with the support of optical microscopy, scanning electron microscopy and energy dispersive spectroscopy. Regarding the VSI required properties, the best results were obtained with the components air quenched and double tempered at 600 °C.