

Improving the properties of K490MC tool steel after hardening accompanied with deep cryogenic treatment and plasma nitriding

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The Böhler K490 MicroClean tool steel was developed for hardening and tempering applications with the possibility of additional nitriding in plasma, gas or salt bath. Its application includes cold working tools and polymer processing tools. The paper analyses the influence of the choice of austenitization temperature, deep cryogenic treatment (DCT), tempering temperature and plasma nitriding on the hardness and microstructure of K490MC steel. The obtained results of the surface hardness and effective nitriding depth was compared on specimens exposed to the DCT process after quenching and then plasma nitrided in the Rübiger direct current (DC) micropuls plasma furnace PC 70/90 in relation to the specimens which were hardened and tempered without DCT and plasma nitrided or nitrided in salt bath Tenifer. Conducted tests of surface layer hardness and microstructure analysis showed combinations in the choice of austenitization temperature, application of DCT and nitriding process which can achieve high surface hardness, good tempering resistance and increased depth of nitriding in the DC micropuls plasma or salt bath Tenifer.

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