IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 8, April 2024

On the Effects of Deep Cryogenic Treatment on Wear Resistance,Hardness and Microstructure of the AISI D2 and D3 Tool Steel

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Abstract: *The present study investigates the effect of cryogenic treatment on AISI D2 and D3 tool steels. This analysis is carried out for several heat treatment cycles that follow various tempering and cryoprocessing sequences that are not analysed erstwhile. Moreover, the effect of these heat treatment cycles on wear characteristics, hardness, and microstructural features of AISI D2 and D3 tool steel is also analysed. It is demonstrated that the cryogenic treatment significantly improves the wear resistance, hardness, and retained austenitic transformation of both types of material specimens under consideration. Furthermore, it is established that single tempering after cryogenic treatment is more effective than double tempering processes carried out in different sequences. It is also revealed that the double tempering sequencing involving cryoprocessing stalls the transformation of retained austenite, leading to higher wear and low hardness in the material*

Keywords: cryogenic treatment, microstructures, wear resistance and hardness

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