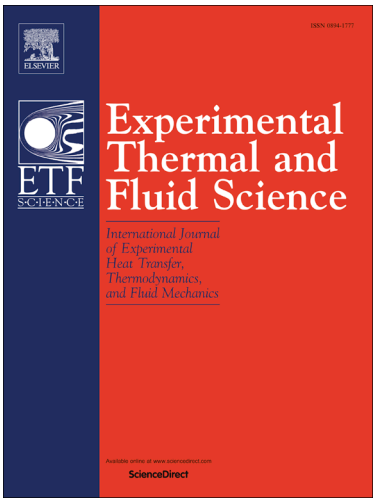

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Refrigeration capacity of silver nanofluids under electrohydrodynamic effect oriented to heat removal in machining process

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Abstract: Nanofluids have been the focus of many laboratories and research centres which seek practical applications for them. Considering the challenges in machining process related with the high temperature in the cutting zone and its influence on the tool life, in this study the nanofluids are employed in a system analogous to the an internally cooled toolholder which can eliminate the use of cutting fluids. In this way, the purpose of this work consists in evaluate the influence of addition of silver nanoparticles in different concentrations in a solution of ethylene glycol/DI-water on the heat transfer coefficient. Moreover, inside the system, the nanofluids were subjected to an electric field in the heat transfer region in order to analyse the influence of the electrohydrodynamic effect. The tests showed that the nanoparticles influenced the fluid viscosity increasing its value up to 20.3% in higher concentrations and also influenced the convective heat transfer coefficient (*h*). Furthermore, it was presented a positive influence of the electric field enhancing the value of the convective heat transfer coefficient (*h*) up to 11% when the concentration was 0,039 vol%. On the other hand, the nanoparticle deposition on the heated surface resulted in reduction of the heat transfer coefficient.

Keywords: Nanofluids, Heat transfer, Electrohydrodynamic effect, Silver nanoparticles, surface deposition;

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