

Accepted Manuscript

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PII: S1359-4311(17)33945-5

DOI: <https://doi.org/10.1016/j.applthermaleng.2017.11.105>

Reference: ATE 11475

To appear in: *Applied Thermal Engineering*

Received Date: 9 June 2017

Revised Date: 17 November 2017

Accepted Date: 21 November 2017

Please cite this article as: M. Hemmat Esfe, S. Esfandeh, Investigation of rheological behavior of hybrid oil based nanolubricant-coolant applied in car engines and cooling equipments, *Applied Thermal Engineering* (2017), doi: <https://doi.org/10.1016/j.applthermaleng.2017.11.105>

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Investigation of rheological behavior of hybrid oil based nanolubricant-coolant applied in car engines and cooling equipments

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Abstract

In this study the rheological behavior of MWCNT-MgO (10-90%) hybrid nanofluids in the base fluid, SAE40 engine oil, investigated experimentally. For this purpose, the nanofluid has been prepared by two-step procedure and viscosity data is measured by viscometer Cap 2000+. The plotted graphs of viscosity versus shear rate and curve fitting of shear stress - shear rate curve show that nanofluid has non-Newtonian behavior and an increase in temperature increasing this behavior. However, the base fluid has Newtonian behavior completely. A comparative study of nanofluid of this study and other nanofluids with the same base fluid shows very different values for viscosity of nanofluids. This applied comparison shows that nanofluids with very different features can be produced using a base fluid. Which can be applied in different areas of lubrication and heat transfer. Comparison of experimental data with proposed theoretical models shows the difference between predicted results and measured values. So at the end of the study, a relation is proposed to estimate the values of viscosity of oil nanofluids.

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