

Abstract Submitted
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How does the viscosity of a lubricant effect its tribological behavior?¹ M. AGGLETON, P. TABOREK, University of California, Irvine — The viscosity of many conventional lubricants varies by many orders of magnitude over a small temperature range. We have exploited this variation to explore the effect of large viscosity changes on lubrication. We have used a sliding block tribometer to measure the coefficient of friction of a steel on steel system with a variety of vacuum compatible hydrocarbon lubricants. Each lubricant was thermally cycled in ultrahigh vacuum from room temperature to below the glass transition temperature. This varies the viscosity without changing the chemistry. Several theoretical models for the temperature dependence of the viscosity of hydrocarbons are applied. The theory described in Cameron (1981) is used to relate the change in viscosity to the coefficient of friction. Some lubricants are found to fit these models up to viscosities as high as 10^6 centiStokes, while for others the model does not even qualitatively describe the data.

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