

DETERMINING THE KINEMATIC VISCOSITY OF LUBRICANT OILS FOR GEAR MOTOR USING NEAR INFRARED SPECTROSCOPY AND WAVELENGTH SELECTION

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Lubricants play a key role in extending the working life of rotating machines. The tests currently employed to assess lubricant properties are time-consuming and require specific equipments for the determination of each parameter of interest. One important parameter consist in determination of the kinematic viscosity [1] in oils because your influence affect the motor proprieties. This study presents chemometric predictive models were developed from near infrared (NIR) [2] spectra for the quantitative determination of the kinematic viscosity (37.1 – 93.1 cSt) of lubricant oils for of lubricant oils for gear motor. Model optimization was based on adequate pre-processing and wavelength selection as internal PLS (iPLS); genetic algorithm (GA), successive projections algorithm (SPA). The prediction results obtained with the different models were compared and decision regarding their statistical significance was taken applying a randomization t-test. Finally, the results obtained for the root mean square errors of prediction (RMSEP) in cSt and relative average error were, respectively, 5.1 and 0.1% (iPLS), 5.4 and 1.3% (GA) and 6.5 and 0.27% (SPA). The method proposed in this work is a useful alternative for the determination of the kinematic viscosity in oils for gear motor.

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References:

[1] Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of Dynamic Viscosity), D 445, ASTM (American Society of Testing Materials), 1994.