

# Assessing Viscosity in Hydro-Erosive Grinding Process via Refractometry

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## Abstract

The manufacturing of diesel injector nozzles requires precision processing to produce multiple micro-holes. An abrasive fluid containing a mixture of mineral oil and hard particles is used for rounding them, ensuring the hydrodynamics of the injection. As verified in a previous investigation, the viscosity of the fluid undergoes uncontrolled changes during hydro-erosive (HE) grinding. Such undesired viscosity changes are detrimental to the process and difficult to assess. The current investigation aims to study the possibility of using the refractive index of the oils used in the HE grinding for assessing their viscosities. A calibration curve correlating the refractive index and viscosity was obtained from the analysis of samples produced by mixing two distinct mineral oils in different proportions. The determined calibration curve was tested with 45 samples of filtered oil, collected directly from the tanks during the HE grinding. The results showed that refractometry is a potential technique for online control of grinding efficiency.

## History

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Refractive index, Fluid viscosity, Injector nozzle, Hydro-erosive grinding, Process efficiency

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