

## Measurement and Prediction of Speed of Sound in Petroleum Fluids

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**Abstract :** Seismic methods play an important role in the exploration for hydrocarbon reservoirs. However, the success of the method depends strongly on the reliability of the measured or predicted information regarding the velocity of sound in the media. Speed of sound has been used to study the thermodynamic properties of fluids. In this study, experimental data are reported and analyzed on the speed of sound in toluene and octane binary mixture. Three-factor three-level Box-Benham design is used to determine the significance of each factor, the synergetic effects of the factors, and the most significant factors on speed of sound. The developed mathematical model and statistical analysis provided a critical analysis of the simultaneous interactive effects of the independent variables indicating that the developed quadratic models were highly accurate and predictive.

**Keywords :** experimental design, octane, speed of sound, toluene

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