

Estimate values of Bulk modulus at effect of pressure and temperature for mineral oil SAE 46 which it is used in hydraulic systems *

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Abstract

Hydraulic system was designed and installed to estimate values of Bulk modulus within the range of pressure between 20 bar to 230 bar and temperature between 5° C to 90° C; these limits are the widest range in which it operates hydraulic systems . In this research the mineral oil (SAE 46) is heated (indirectly method) and then pressed into a pipe with large thickness compared with internal diameter so as to ensure that the results will not be affected by the elasticity of the pipe material. The results for the characteristics, the pressure and temperature have been indicated by gages installed on the line of hydraulic circuit while taking readings compressibility through indicator tube. It was concluded that the temperature of mineral oil have an effective impact on the Bulk modulus values even at lower temperatures lower than 50° C and the sloop (of the relation curve between Bulk modulus and pressure) is reduced with temperature increase. it was also estimated that values of Bulk modulus are volatileat pressures less than 100 bar with increasing temperatures for this mineral oil.

Key words: Bulk modulus – mineral oil – compressibility – temperature – hydraulic systems

*For The paper in Arabic see pages (179-190)

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