

Attachment IX

Esters as Lubricating Oils

Report by Dr. Zorn 11/11/43
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Esters as Lubricating Oil Improving Agents

Address Before the Plasticizer Conference in Frankfurt

11/11/43

I shall endeavor to give you an idea of the significance of esters as compounding agents in the field of lubrication.

One of the most important properties of a lubricant is its viscosity-temperature relation. This relation has been characterized by American workers by the Viscosity Index, the so-called V.I. The higher the V.I., the lower is the dependence of viscosity on temperature, and the flatter the viscosity curve. Another characterization has been proposed by Walther and Ubbelohde,

Fig. 1,

who plot absolute temperature against viscosity in a logarithmic diagram. The viscosity-temperature curve then becomes a straight line. The slope of the line, expressed as the "m" value, is an index of the viscosity-temperature relation of the lubricant. Walther and Ubbelohde make the further assumption that the straight viscosity lines of different viscous oils of the same origin intersect in a point called the "Viscosity Pole". The dependence of viscosity on temperature decreases with the distance of the Viscosity Pole from the abscissa, and is expressed as the "Viscosity Pole Height" (VP). A good viscosity temperature relation must have small values of "m" and "VP".

The dependence of the viscosity-temperature relation of esters on their chemical constitution is illustrated in the following charts.

* Translators Note:

This report is an abbreviated version of Dr. Zorn's report of May 14, 1943 (Attachment VIII.). The charts, with their corresponding sections in the text, are correlated as follows:

Report of May 14, 1943

Report of November 11, 1943

Attachment VIII

Attachment IX

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Fig. 2
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