The Kappa System Viscosity for Synthetic Oils - Issue 20110714 >>>

Vanair again wishes to thank Markus Raabe of MESYS in Switzerland (www.mesys.ch) which writes bearing design programs and other machine design programs. He has supplied the missing formulas that allow a user of the Kappa (k) oil film system* to transpose the mineral oil system values to synthetic or other oil film values.

In order to do this, the following equations were used to generate the end formula >>>

From ISO 281 – 2007, the following ***approximate*** formula was used (the Dawson & Higginson equation for line contact) >>>

$$k \approx \Lambda^{1.3} \quad (1)$$

Where >>>

k = is the scalar value in the kappa oil film value system.
Λ = is the scalar value in the Lambda oil film value system.

The following formula establishes the kappa relationship between synthetic and mineral oils >>>

$$k_{syn} = k_{mineral} \left[\alpha_{syn} / \alpha_{mineral}\right]^{(x)(y)} \quad (2)$$

Where >>>

k_{syn} = is the synthetic oil scalar value for in the kappa oil film value system.
$k_{mineral}$ = is the mineral oil scalar value for in the kappa oil film value system.
x = is the exponent for G in the oil film thickness equation and is equal to **0.54.**
y = is the exponent of Lambda in **k – Λ** (1) equation and is equal to **1.3.**
α = is the pressure viscosity coefficient for each type of oil.

Therefore, the ***approximate*** formula has the final form of >>>

$$k_{syn} = k_{mineral} \left[\alpha_{syn} / \alpha_{mineral}\right]^{(0.7)} \quad (3)$$

(*) For the original natural or mineral oil formulas see Vanair's original **TDM** on this topic on its website.