

## **A Modified Kardos Equation for the Thermal Conductivity Prediction of Refrigerants**

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Back in the 1934, Kardos derived a theoretical equation for the thermal conductivity of liquids starting from the Bridgman equation. He assumed that the temperature drop in the liquid changes exponentially and that the energy drop occurs in the intermolecular spaces. Then he assumed that the heat is transferred along a row of molecules with the velocity of sound. In Kardos equation, thermal conductivity is a function of density of liquid, heat capacity at constant pressure, speed of sound in liquid, average distance between centers of molecules (used by Bridgman), and diameter of molecules. For the average distance between centers of molecule, he assumed a constant value for all liquids while a cubic distribution of molecules was assumed. Even if the Kardos equation has strong theoretical basis and it was considered as a starting point to many other interesting studies, the proposed formula leaded often to very poor results. Thus, this work presents a modification of the Kardos equation specifically oriented to refrigerants. The proposed equation was tested for both liquid and vapor thermal conductivities. Results show that the proposed equation is able to predict the thermal conductivity with very low deviation for the main refrigerants.