the conductivities of the binary mixtures of CO_2-N_2-C_2H_6 by assuming that the contribution of the internal degrees of freedom were additive to the hard sphere conductivity:

$$k = k_{hs} + k_{ie} \tag{6}$$

where, for pure compounds,

$$k_{ie} = F\rho D\left(C_v - \frac{3}{2}\frac{k_B}{m}\right) \tag{7}$$

The factor F is an arbitrary weighting factor to be determined by regression analysis on the data for the pure compounds along with the effective molecular diameter, σ. In the curve fit for pure gases, the product ρD was assumed constant, and the one atmosphere values were used. The values obtained for molecular diameter, F, and the standard errors of estimate are:

Gas	σ, Å	F	S, %	Max. Dev., %
Carbon Dioxide	4.56	1.045	4.6	-8.3
Nitrogen	3.97	1.113	4.4	+7.0
Ethane	5.04	.68	3.9	-7.5

The calculated monatomic thermal conductivities were first approximations since the mixture equation is a first approximation.

These values of σ were used to calculate mixture hard sphere conductivities using Thorne's equations. The contri-