Rayleigh number, the error introduced by laminar convection is relatively small. To determine the ΔT at which turbulent convection begins, measurements were made at varying ΔT's with carbon dioxide in the cell and at the pressure corresponding to its critical density. It is at this density that turbulent convection most easily occurs. The results of these measurements are shown in Figure 2 and indicate that in this worst case, convection will have a serious effect above a ΔT of 0.75°C. At temperature differences less than 0.75°C convection will not affect the measurement more than a small fraction of a percent. Therefore, measurements away from the critical density were made with temperature differences less than 1.0°C, while close to the critical density, the temperature differences were maintained less than about 0.6°C for CO_2. This procedure was also followed for ethane and all mixtures.

Related to convection is the effect of <u>thermal diffusion</u>. With mixtures of gases and a temperature gradient it is possible that some separation of components may occur. The effect of ordinary radial diffusion can be shown to be quite negligible; however, when circulation occurs, the cell becomes essentially a Clusius-Dickel column, and there is the possibility that considerable separation could occur at the higher densities. During his measurements on the conductivity of carbon dioxide-nitrogen mixtures, Keyes (12) noticed that his cell thermocouple