however, it is necessary to take into consideration the effect of the walls if the gap is narrow (4, 24, 26). Leidenfrost demonstrates that correcting data in this manner can lead to serious over-correction and errors of the same magnitude as the original, but in the opposite direction. Even though the necessary information is not available to make a correction in the case of the present work, it can be demonstrated that the error caused by absorption of radiation is small (7).

Pressure has a negligible effect on cell dimensions (7). For example, the error introduced in the measured conductivity by increasing the pressure from 1 atm. to 3,000 atm. is approximately 0.05%.

Cell Model

It is easily demonstrated (7) that the cell may be characterized to a good approximation by the infinite summation:

$$\frac{\Delta T}{q} = A\left[1 + B\left(1 - \frac{k_r}{k} + \left(\frac{k_r}{k}\right)^2 - \cdots\right)\right] \qquad (1)$$

A and B are constants at a particular temperature and are determined by the cell geometry and the physical properties of the materials of construction. $k_r \times \Delta T / t$ is the radiant heat flux across the gap, where k_r is defined by

$$k_r = \left[4\sigma\left(\frac{\epsilon}{2-\epsilon}\right)T^3\right]\left[t \ln\left(\frac{r_o}{r_i}\right)\right] \qquad (2)$$

k_r remains constant at a particular temperature if the emissivities and cell dimensions remain constant.