

Nonlinear Distortion. A sound wave produces an expansion and a compression of the air in which it is traveling. We find from Eq. (2.6) that the relation between the pressure and the volume of a small “box” of the air at 20°C through which a sound wave is passing is

$$P = \frac{0.726}{V^{1.4}} \quad (9.30)$$

where V = specific volume of air in $\text{m}^3/\text{kg} = 1/\rho_0$

P = absolute pressure in bars, where 1 bar = 10^5 newtons/ m^2

This equation is plotted as curve AB in Fig. 9.11

Assuming that the displacement of the diaphragm of the driver unit is sinusoidal, it acts to change the volume of air near it sinusoidally. For