

Peng-Robinson EOS

$$p = \frac{RT}{(v-b)} - \frac{a}{\left[v + (1-\sqrt{2})b\right]\left[v + (1+\sqrt{2})b\right]}$$

$$a = \Omega_a \frac{(RT_c)^2}{P_c} \left[1 + m(\omega) \left(1 - \sqrt{T/T_c}\right)\right]^2$$

$$b = \Omega_b \frac{RT_c}{P_c}$$

$$\Omega_a \approx 0.457236$$

$$\Omega_b \approx 0.077796$$

$$Z_c \approx 0.307401$$

For the original (1976 - 77) version of the EOS,

$$m(\omega) = 0.37464 + 1.54226\omega - 0.26992\omega^2$$

For the updated (1979) version of the EOS,

$$m(\omega) = 0.37464 + 1.54226\omega - 0.26992\omega^2, \quad \omega \leq 0.49$$

$$m(\omega) = 0.379642 + 1.48503\omega - 0.164423\omega^2 + 0.016666\omega^3, \quad \omega > 0.49$$

ω = acentric factor