Real Gas EOS @model

@wikipedia

Equation of State for the Real Gas:

(1) $$\rho(p,T) = \frac{1}{Z} \cdot \frac{M}{R} \cdot \frac{p}{T}$$

where

ρ	Gas density	p	Gas pressure	M	Gas molar mass
$Z(T,p)$	Compressibility factor	T	Gas temperature	R	Gas constant

Despite the name it covers a lot of medium-density liquids as well.

Pure Substances

The Z-factor $Z(p,T)$ of pure substances is usually modelled through the reduced fluid properties (T_r, p_r):

$T_r = T/T_c$	Reduced Temperature	T_c	ritical temperature
$p_r = p/p_c$	Reduced Pressure	p_c	Critical pressure

Below is the list of the most popular Real Gas EOS @models:

Peng–Robinson-Stryjek-Vera (PRSV) EOS @model
Peng–Robinson (PR) EOS @model
Soave-Redlich-Kwong (SRK) EOS @model

Fluid Mixtures

The Z-factor $Z(p,T)$ of fluid mixtures is usually modelled through the pseudo-reduced fluid properties (T_{pr}, p_{pr}):

$T_{pr} = T/T_{pc}$	Reduced Temperature	T_{pc}	Pseudo-critical temperature
$p_{pr} = p/p_{pc}$	Reduced Pressure	p_{pc}	Pseudo-critical pressure

See Z-factor Correlations @model for the charts, implicit and explicit empirical correlations on fluid mixture Z-factor $Z(T_{pr}, p_{pr})$.

See also