PVT Correlation List

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A list of PVT correlation methods for gas, oil, and water (also available in `pvt_correlation` module in `pyreservoir` package). Compiled by Yohanes Nuwara from Towler's *Fundamental Principles of Reservoir Engineering* (2001). All properties in Field Units.

Fluid	Property	Correlation	Validity Range	Average Absolute Error
Gas	Pseudo-critical P, T (P_{pc}, T_{pc})	Sutton (1985)	$0.57 < \gamma_g < 1.68$	unspecified
Gas	Pseudo-reduced P, T (P_{pr}, T_{pr})	Wichert and Azis (1972)	$X_{CO_2} < 0.544; X_{H_2S} < 0.788;$ $154 < p < 7026; 70 < T < 300$	0.97%
Gas	Isothermal Compressibility (c_g)	Trube (1957); Mattar (1975)	unspecified	unspecified
Gas	Viscosity (μ_g)	Lee et al (1996)	$100 < p < 8000; 100 < T < 340;$ $0.009 < X_{CO_2} < 0.032; X_{N_2} < 0.048$	2.7-9.0%
Gas	z-factor (z)	Dranchuk and Aboukassem (1975)	$0.2 < P_{pr} < 30; 1 < T_{pr} < 3$	0.486%
Oil	Bubble-point Pressure (p_b)	Vazquez and Beggs (1980)	$50 < p < 5250; 70 < T < 295; 20 < R_{sb} < 2070;$ $16 < API < 58; 0.56 < \gamma_g < 1.18$	0.7%
Oil	FVF for $p < p_b$ (B_o)	Vazquez and Beggs (1980)	unspecified	unspecified

Fluid	Property	Correlation	Validity Range	Average Absolute Error
Oil	FVF for $p \geq p_b$ (B_o)	Levitan and Murtha (1999)	unspecified	unspecified
Oil	Viscosity for $p \leq p_b$ (μ_o)	Beggs and Robinson (1975); Chew and Connally (1959)	$0 < p < 5250; 70 < T < 295; 20 < R_s < 2070;$ $16 < API < 58$	1.83%
Oil	Viscosity for $p > p_b$ (μ_o)	Vazquez and Beggs (1980)	$126 < p < 9500; 9.3 < R_s < 2199;$ $15.3 < API < 59.5; 0.511 < \gamma_g < 1.351$	7.54%
Oil	Isothermal compressibility for $p < p_b$ (c_o)	McCain (1989)	unspecified	unspecified
Oil	Isothermal compressibility for $p \geq p_b$ (c_o)	Vazquez and Beggs (1980)	unspecified	unspecified
Oil	Solution gas-oil ratio for $p < p_b$ (R_s)	Vazquez and Beggs (1980)	unspecified	unspecified
Water	Vapor pressure (p_b)	Antoine (1888)	unspecified	unspecified
Water	Isothermal compressibility for $p \leq p_b$ (c_o)	McCain (1989)	unspecified	unspecified
Water	Isothermal compressibility for $p > p_b$ (c_o)	Osif (1988)	$1,000 < p < 20,000; s < 0.2; 200 < T < 270$	unspecified
Water	Viscosity (μ_w)	McCain (1989)	$p < 15,000; 100 < T < 400; 0 < s < 0.26$	4-7%