Bubble-Point Pressure and Oil Formation Volume Factor (Standing)

Bubble-point pressure and oil formation volume factor of a crude from solution gas-oil ratio, gas gravity, API gravity and temperature by Standing's correlations.

Method: Ahmed; Reservoir Engineering Handbook; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Solution gas-oil ratio at the bubble point	350.00	scf/STB
Solution gas gravity (air = 1)	0.75000	
Oil gravity	30.000	
Reservoir temperature	93.333	°C

Calculated results

Parameter	Value	Unit
Bubble-point pressure	1,889.0	psi
Oil formation volume factor at the bubble point	1.2210	
Oil specific gravity	0.87616	

Notes for this case

- Standing's correlations come from California crudes; use them with caution when the gas holds much CO_2, N_2 or H_2S. Temperatures in °F are taken as T(°R) − 460, as in Ahmed's equations.

Formula and method

$$p_b = 18.2\left[\left(\frac{R_s}{\gamma_g}\right)^{0.83} 10^{a} - 1.4\right], \quad a = 0.00091(T-460) - 0.0125\,\mathrm{API}$$

$$B_o = 0.9759 + 0.000120\left[R_s\left(\frac{\gamma_g}{\gamma_o}\right)^{0.5} + 1.25(T-460)\right]^{1.2}$$

Variables

R_s	Solution gas-oil ratio at the bubble point	m³/m³
γ_g	Solution gas gravity (air = 1)	-
API	Oil gravity	-
T	Reservoir temperature	K
p_b	Bubble-point pressure	Pa
B_{ob}	Oil formation volume factor at the bubble point	-
γ_o	Oil specific gravity	-

Method and standards

Standing's correlations in field units (psia, scf/STB, °R).

Assumptions and limits

- Black oil; hydrocarbon gas.

References

- Ahmed
- Reservoir Engineering Handbook
- 5th ed. (Gulf Professional Publishing, 2019)
- ch. 2
- eqs. 2-76
- 2-77 and 2-84 (Standing, 1981)

Report details

Report reference	FCC-8XRD-WNKR (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/chemical/oil-gas/standing-bubble-point-bo

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Reopens the calculator with the inputs of this report.