Vogel Inflow Performance for a Solution-Gas Drive Well

Maximum oil rate (AOF) of a well from one test point by Vogel's inflow relation, and the oil rate at any other bottom-hole flowing pressure.

Method: Ahmed; Reservoir Engineering Handbook; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Average reservoir pressure	2,400.0	psi
Bottom-hole pressure on test	1,800.0	psi
Oil rate on test	100.00	bbl/d
Bottom-hole pressure of interest	800.00	psi

Calculated results

Parameter	Value	Unit
Maximum rate (absolute open flow)	250.00	bbl/d
Oil rate at p_wf	211.11	bbl/d
Productivity at p_wf (rate per drawdown)	3.5214e-11	

Notes for this case

• Vogel's relation is for saturated (solution-gas drive) reservoirs at or below the bubble point and assumes no skin. The productivity output is in SI (m³/s per Pa).

Formula and method

$$\frac{q_o}{q_{max}} = 1 - 0.2\frac{p_{wf}}{\bar{p}_r} - 0.8\left(\frac{p_{wf}}{\bar{p}_r}\right)^2$$

Variables

$\bar{p}_r$	Average reservoir pressure	Pa
$p_{wf,t}$	Bottom-hole pressure on test	Pa
q_t	Oil rate on test	m³/s
p_{wf}	Bottom-hole pressure of interest	Pa
q_{max}	Maximum rate (absolute open flow)	m³/s
q_o	Oil rate at p_wf	m³/s
J^*	Productivity at p_wf (rate per drawdown)	-

Method and standards

Vogel's dimensionless IPR.

Assumptions and limits

- Saturated reservoir; zero skin.

References

• Ahmed
• Reservoir Engineering Handbook
• 5th ed. (Gulf Professional Publishing, 2019)
• ch. 7
• eq. 7-9 (Vogel, 1968)

Report details

Report reference	FCC-GNJC-P500 (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/vogel-ipr

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Reopens the calculator with the inputs of this report.