Future IPR as Pressure Declines: Standing, Fetkovich, Wiggins

Present maximum oil rate from a stabilised test (Vogel and Wiggins) and the future maximum rate at a lower reservoir pressure by Standing, Fetkovich and Wiggins.

Input parameters

Unit system: SI

Parameter	Value	Unit
Present average reservoir pressure	3,200.0	psi
Present stabilised test rate	800.00	bbl/d
Present test bottom-hole pressure	2,400.0	psi
Future average reservoir pressure	1,600.0	psi
Future bottom-hole pressure for the rate forecast	600.00	psi

Calculated results

Parameter	Value	Unit
Present maximum rate (Vogel)	2,000.0	bbl/d
Present maximum rate (Wiggins)	2,352.9	bbl/d
Future maximum rate (Standing)	600.00	bbl/d
Future maximum rate (Fetkovich)	250.00	bbl/d
Future maximum rate (Wiggins)	670.59	bbl/d
Future rate at the chosen pressure (Standing with Vogel)	487.50	bbl/d

Notes for this case

- Saturated (solution-gas drive) reservoirs. Standing's method scales Q_max with the ratio of oil mobility functions; Fetkovich's cube law is simpler and more pessimistic. Wiggins's form is fitted to simulation results.

Formula and method

$$(Q_{max})_f = (Q_{max})_p \frac{\bar{p}_f}{\bar{p}_p}\left(0.2 + 0.8\frac{\bar{p}_f}{\bar{p}_p}\right), \quad (Q_{max})_f = (Q_{max})_p \left(\frac{\bar{p}_f}{\bar{p}_p}\right)^3, \quad (Q_{max})_f = (Q_{max})_p \left[0.15\frac{\bar{p}_f}{\bar{p}_p} + 0.84\left(\frac{\bar{p}_f}{\bar{p}_p}\right)^2\right]$$

Variables

$(\bar{p}_r)_p$	Present average reservoir pressure	Pa
Q_{test}	Present stabilised test rate	m³/s
$p_{wf,test}$	Present test bottom-hole pressure	Pa
$(\bar{p}_r)_f$	Future average reservoir pressure	Pa
p_{wf}	Future bottom-hole pressure for the rate forecast	Pa
$(Q_{max})_p$	Present maximum rate (Vogel)	m³/s
$(Q_{max})_{p,W}$	Present maximum rate (Wiggins)	m³/s
$(Q_{max})_{f,S}$	Future maximum rate (Standing)	m³/s
$(Q_{max})_{f,F}$	Future maximum rate (Fetkovich)	m³/s
$(Q_{max})_{f,W}$	Future maximum rate (Wiggins)	m³/s
Q_o	Future rate at the chosen pressure (Standing with Vogel)	m³/s

Method and standards

Future inflow performance.

Assumptions and limits

- Solution-gas drive; zero skin.

Report details

Report reference	FCC-6RGJ-ZGQD (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/reservoir-engineering/future-ipr-standing-fetkovich-wiggins

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.