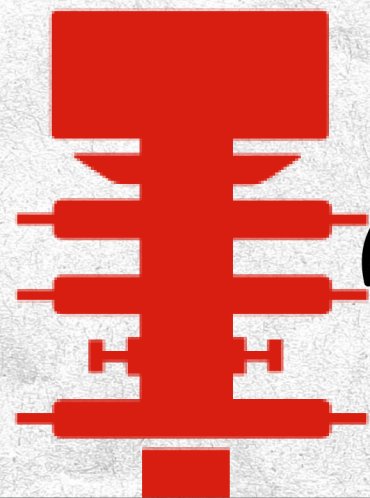


INFINITE ENERGY
SOLUTIONS



THE *Boyle's Law* CHEAT SHEET

Kick Any Boyle's Law Problem in the Butt!



by

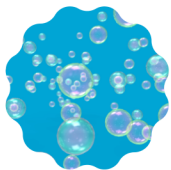
Krystina Amos
Well Control Expert



Formation Pressure

The gas kick came from the formation, and fluids are what give formations pressure. So the original pressure of the gas was the formation pressure.

P1



Original kick size (volume)

What was the original pit gain? This was the original kick size (kick volume).

V1



Pressure above gas bubble

1: If gas is migrating (well not shut in):

$P2$ = hydrostatic pressure of the mud above the gas.

2. If gas is at surface (well not shut in):

$P2$ = atmospheric pressure (about 14.7 psi).

3. If you're circulating the gas up the well:

$P2$ = Hydrostatic pressure of the mud above the gas + casing pressure.

4. If you circulated the gas to surface:

Right before the gas exits the choke, $P2$ = casing pressure.



P2



New kick size (volume)

This is how big the gas bubble is after it's expanded due to being under less pressure.

If gas is migrating up a shut-in well, and pressure was never bled off at surface, $P2 = P1$, therefore $V2 = V1$. Gas cannot expand unless pressure is bled off from the well.

V2

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