Gas Hydrate Formation Temperature (Towler–Mokhatab)

Temperature below which natural gas forms hydrates at a pressure, from its gravity (Towler–Mokhatab fit of the Katz chart), and the margin to the line.

Method: Mokhatab; Poe and Speight; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Gas pressure (absolute)	661.37	psi
Gas specific gravity (air = 1)	0.70900	
Lowest line temperature	4.4444	°C

Calculated results

Parameter	Value	Unit
Hydrate formation temperature	15.047	°C
Cooling below the hydrate point (positive = hydrates form)	10.602	K

Notes for this case

- A fit of the Katz gravity chart for sweet natural gas; with much CO_2 or H_2S use a sour-gas method. Free water must be present for hydrates to form.
- The line is colder than the hydrate point: dehydrate the gas, heat the line or inject an inhibitor (see the Hammerschmidt calculator).

Formula and method

$$T_h = 13.47 \ln P + 34.27 \ln SG - 1.675 \ln P \ln SG - 20.35 \ \ (^\circ\mathrm{F},\ \mathrm{psia})$$

Variables

P	Gas pressure (absolute)	Pa
SG	Gas specific gravity (air = 1)	-
T_l	Lowest line temperature	K
T_h	Hydrate formation temperature	K
$T_h - T_l$	Cooling below the hydrate point (positive = hydrates form)	K

Method and standards

Towler–Mokhatab correlation.

Assumptions and limits

- Sweet natural gas; Katz chart accuracy.

References

- Mokhatab
- Poe and Speight
- Handbook of Natural Gas Transmission and Processing (Gulf Professional Publishing, 2006)
- ch. 3
- eq. 3-53 (Towler and Mokhatab, 2005)
- Example 3-2

Report details

Report reference	FCC-XAT1-3Y6R (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/gas-hydrate-formation-temperature

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.