Gas Meter Reading to Normal and Standard Volume

Converts an actual gas flow at line pressure and temperature to normal (0 °C, 1 atm) and standard (15 °C, 1 atm) volume with a compressibility factor.

Method: Real-gas law V_n = V (p/p_n)(T_n/T)/Z

Input parameters

Unit system: SI

Parameter	Value	Unit
Actual flow at the meter	500.00	m³/h
Line pressure Shown as gauge (bar g, kg/cm² g, psig); choose an absolute unit to enter absolute pressure. Using a gauge reading as absolute is the commonest error.	1.9868	bar g
Gas temperature	30.000	°C
Compressibility factor	0.99500	
Standard reference temperature 15 °C by default; some contracts use 20 °C or 60 °F (15.56 °C).	15.000	°C
Water vapour in the gas, by volume (0 = dry) For wet biogas: the share of water vapour at the meter, to give dry normal volume.	0	%

Calculated results

Parameter	Value	Unit
Normal flow (0 °C, 1 atm, dry if water vapour is entered)	1,340.6	Nm³/h
Standard flow (at the standard temperature, 1 atm)	1,414.2	m³/h
Correction factor to normal	2.6812	

Formula and method

$$f = \frac{p}{p_n}\frac{T_n}{T}\frac{1-y_w}{Z}, \quad \dot{V}_n = f\dot{V}, \quad \dot{V}_s = \dot{V}_n\frac{T_s}{T_n}$$

Variables

$\dot{V}$	Actual flow at the meter	m³/s
p	Line pressure (absolute)	Pa
T	Gas temperature	K
Z	Compressibility factor	-
$\dot{V}_n$	Normal flow (0 °C, 1 atm)	Nm³/s
$\dot{V}_s$	Standard flow (15 °C, 1 atm)	m³/s
f	Correction factor to normal	-
$p_n\$, \$T_n$	normal pressure and temperature, 101.325 kPa and 273.15 K	Pa, K
T_s	standard reference temperature (15 °C default)	K
y_w	water vapour in the gas by volume (0 = dry)	-

Method and standards

Real-gas law with a compressibility factor; the standard volume is at the reference temperature you choose and 1 atm.

Assumptions and limits

- Dry gas unless a water vapour share is entered, which is then removed from the normal and standard volumes.
- The line pressure is shown as gauge by default; the calculation uses absolute pressure.
- The standard pressure is 1 atm (101.325 kPa); a 60 °F contract at 14.73 psia differs by about 0.2 %.

References

- Real-gas law V_n = V (p/p_n)(T_n/T)/Z

Report details

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Release checks	2 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/boilers-power-plant/combustion/gas-meter-standard-volume

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Reopens the calculator with the inputs of this report.