Pressure Unit Converter (bar, kg/cm², psi, kPa, mmWC, gauge)

Convert a pressure between bar, kg/cm², psi, kPa, MPa, atm, mmHg, mm and inches of water column, absolute and gauge, as boiler gauges and steam tables need.

Method: NIST SP 811 (2008); Appendix B conversion factors

Input parameters

Unit system: SI

Parameter	Value	Unit
Pressure (choose its unit; gauge units add one standard atmosphere)	10.000	bar g

Calculated results

Parameter	Value	Unit
pascal (absolute)	1,101,325	Pa
kilopascal (absolute)	1,101.3	kPa
megapascal (absolute)	1.1013	MPa
bar (absolute)	11.013	bar
bar gauge	10.000	bar g
kg/cm² (absolute, ata)	11.230	kg/cm²
kg/cm² gauge (atg)	10.197	kg/cm² g
psi (absolute, psia)	159.73	psi
psi gauge (psig)	145.04	psig
standard atmosphere	10.869	atm
millimetre of mercury (absolute)	8,260.6	mmHg
millimetre of water column (absolute)	112,304	mmWC
inch of water column (absolute)	4,421.4	inWC

Notes for this case

- Gauge pressure = absolute − 1 standard atmosphere (1.01325 bar). A negative gauge value is vacuum.

Formula and method

$$p_{abs} = p_g + 101\,325 \text{ Pa}$$

$$1 \text{ kg/cm}^2 = 98\,066.5 \text{ Pa}, \quad 1 \text{ psi} = 6894.757 \text{ Pa}, \quad 1 \text{ bar} = 10^5 \text{ Pa}$$

Variables

p	Pressure (choose its unit; gauge units add one standard atmosphere)	Pa

Method and standards

Exact definitions of the units (kilogram-force, pound-force, bar, standard atmosphere), with factors from NIST SP 811; gauge units add one standard atmosphere.

Assumptions and limits

- Gauge values refer to the standard atmosphere, not the local barometer.
- Water column at the conventional density (9.80665 Pa per mm).

References

- NIST SP 811 (2008)
- Appendix B conversion factors

Report details

Report reference	FCC-H2WY-M37A (the same inputs always give the same reference)
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Method last reviewed	12 November 2026
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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/general/unit-conversions/pressure-unit-converter

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.