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)	9.8066	bar g

Calculated results

Parameter	Value	Unit
pascal (absolute)	1,081,990	Pa
kilopascal (absolute)	1,082.0	kPa
megapascal (absolute)	1.0820	MPa
bar (absolute)	10.820	bar
bar gauge	9.8066	bar g
kg/cm² (absolute, ata)	11.033	kg/cm²
kg/cm² gauge (atg)	10.000	kg/cm² g
psi (absolute, psia)	156.93	psi
psi gauge (psig)	142.23	psig
standard atmosphere	10.678	atm
millimetre of mercury (absolute)	8,115.6	mmHg
millimetre of water column (absolute)	110,332	mmWC
inch of water column (absolute)	4,343.8	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

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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.