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)	10.342	bar g

Calculated results

Parameter	Value	Unit
pascal (absolute)	1,135,539	Pa
kilopascal (absolute)	1,135.5	kPa
megapascal (absolute)	1.1355	MPa
bar (absolute)	11.355	bar
bar gauge	10.342	bar g
kg/cm² (absolute, ata)	11.579	kg/cm²
kg/cm² gauge (atg)	10.546	kg/cm² g
psi (absolute, psia)	164.70	psi
psi gauge (psig)	150.00	psig
standard atmosphere	11.207	atm
millimetre of mercury (absolute)	8,517.2	mmHg
millimetre of water column (absolute)	115,793	mmWC
inch of water column (absolute)	4,558.8	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.