Ideal Gas State Change

Sample document with complete example values. It shows the report the purchased export produces for YOUR input - it is not itself a report for any part.

Project: Sample project | Part/Position: no real part | Prepared by: Sample, not released

State change: Adiabatic state change (Q = 0). Gas mass m = 1 kg, isentropic exponent κ = 1.4.

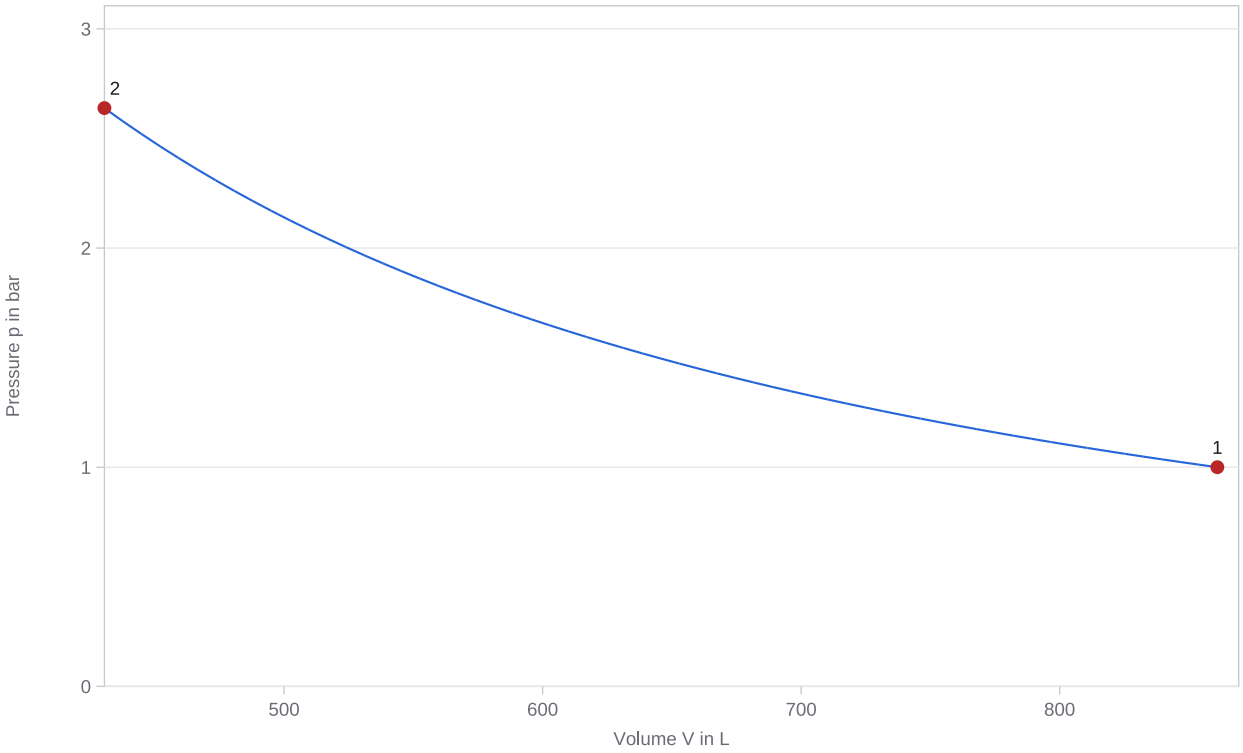
States

State 1: Pressure p	1 bar
State 1: Volume V	861 L
State 1: Temperature T	300 K = 26.85 °C
State 2: Pressure p	2.6385 bar
State 2: Volume V	430.5 L
State 2: Temperature T	395.78 K = 122.63 °C

Energy quantities

Volume change work W_{12}	68.767 kJ
Heat Q_{12}	0 kJ
Change in internal energy ΔU	68.767 kJ
Entropy change ΔS	−0 J/K

p-V diagram



Calculation basis

Ideal gas with p·V = m·R_s·T. The state change follows the relation $p \cdot V^m$ = const (isothermal m = 1, isobaric m = 0, adiabatic m = κ, polytropic m = n); isochoric keeps V constant. Work, heat and internal energy are calculated mass-specifically from the state quantities and scaled with the mass. Sign convention: work and heat supplied to the gas are positive, the first law ΔU = Q + W applies. State changes are idealized as reversible and quasi-static; real friction and flow losses are not considered.

About this sample

All values on these pages come from a freely chosen example calculation and belong to no real part. The purchased export contains the same sections with your input, your header data (project, part, prepared by) and as searchable text. Pricing and scope: maschinenbaurechner.de/en/pricing