Compressor Settle-Out Pressure after Shutdown

Pressure reached when the suction and discharge sides of a compressor loop equalise after a trip, from their volumes, pressures and temperatures.

Method: Ideal-gas settle-out balance

Input parameters

Unit system: SI

Parameter	Value	Unit
Suction-side volume	30.000	m³
Suction pressure (absolute)	2.0000	MPa
Suction-side gas temperature	30.000	°C
Discharge-side volume (to the check valve)	15.000	m³
Discharge pressure (absolute)	6.0000	MPa
Discharge-side gas temperature	60.000	°C

Calculated results

Parameter	Value	Unit
Settle-out pressure	3.3333	MPa
Mixed gas temperature (ideal gas, constant c_v)	47.315	°C
Gas in the loop (kmol)	56.296	

Notes for this case

- Ideal gas, adiabatic mixing with constant c_v: moles add and the mixed temperature is the mole-weighted mean, so p_so = (p_sV_s + p_dV_d)/(V_s + V_d). Real settle-out analysis uses the gas's equation of state and cooler heat; the suction side and the compressor casing must be rated for p_so.

Formula and method

$$p_{so} = \frac{p_s V_s + p_d V_d}{V_s + V_d} \ \text{(ideal gas, adiabatic mixing)}$$

Variables

V_s	Suction-side volume	m³
p_s	Suction pressure (absolute)	Pa
T_s	Suction-side gas temperature	K
V_d	Discharge-side volume (to the check valve)	m³
p_d	Discharge pressure (absolute)	Pa
T_d	Discharge-side gas temperature	K
p_{so}	Settle-out pressure	Pa
T_{so}	Mixed gas temperature (ideal gas, constant c_v)	K
n	Gas in the loop (kmol)	-

Method and standards

Settle-out balance.

Assumptions and limits

- Ideal gas; adiabatic; equal heat capacities.

References

Ideal-gas settle-out balance

Report details

Report reference	FCC-SC1P-DFNP (the same inputs always give the same reference)
Generated	23 November 2026, 18:00 UTC
Calculator	Compressor Settle-Out Pressure after Shutdown
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
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/mechanical/compressors/compressor-settle-out-pressure

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.