

Power Factor Penalty Calculator

Estimate current and threshold apparent power, excess kVA, and the resulting rate-based charge from entered power-factor and billing assumptions.

Generated October 10, 2026

<https://www.elecatrix.com/power-energy-cost/power-factor-penalty-calculator/>

Inputs

Input	Value	Unit
Real power	120	kW
Current power factor	0.82	x
Minimum power factor	0.9	x
Penalty rate	12	\$/kVA-month
Billing months	12	months

Results

Result	Value	Unit
Current apparent power	146.3415	kVA
Minimum apparent power	133.3333	kVA
Excess apparent power	13.0081	kVA
Annual penalty charge	1873.1707	\$
Power factor shortfall	8	%

Calculation details

Detail	Value	Unit
Calculation basis	Apparent power equals real power divided by power factor. The penalty estimate multiplies the apparent-power shortfall by the entered rate and billed months.	
Boundary	Screening estimate only; no tariff nuance, capacitor sizing, harmonic condition, utility approval, or final billing result is made by this calculator.	

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Formulas

current apparent power kVA = real power kW / current power factor

minimum apparent power kVA = real power kW / minimum power factor

excess apparent power kVA = max(current kVA - minimum kVA, 0)

estimated penalty = excess apparent power kVA x demand rate x billing months

Warnings and limitations

This power-factor penalty estimate uses entered thresholds and rates only. It does not model tariff subtleties, capacitor banks, harmonic conditions, utility approval, or final billing rules.