

Transformer All-Day Efficiency Calculator

Calculate time-weighted transformer energy efficiency from manufacturer or test-record loss values across an entered operating profile.

Generated October 10, 2026

<https://www.elecatrrix.com/power-quality-transformers/transformer-all-day-efficiency-calculator/>

Inputs

Input	Value	Unit
Load profile rows	Rows: 2	
Row 1 - Period label	Day	
Row 1 - Hours	12	h
Row 1 - Load fraction	50	%
Row 1 - Power factor	100	%
Row 2 - Period label	Night	
Row 2 - Hours	12	h
Row 2 - Load fraction	25	%
Row 2 - Power factor	100	%
Transformer rated kVA	100	kVA
No-load loss	200	W
Full-load loss	1200	W
Profile note	Record loss test basis, tap, temperature, and source model separately.	

Results

Result	Value	Unit
Profile hours	24	h
Peak profile load	50	kVA
Output energy	900	kWh
Core-loss energy	4.8	kWh

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Load-loss energy	4.5	kWh
Total loss energy	9.3	kWh
Input energy	909.3	kWh
All-day efficiency	98.9772	%
Calculation details		

Detail	Value	Unit
Calculation basis	Core loss is applied across each entered hour. Load loss is scaled by the square of the entered load fraction, and output energy uses rated kVA, load fraction, power factor, and hours.	
Transformer boundary	Energy estimate only; loss values must come from the named transformer or test record, and no transformer selection, thermal approval, utility result, or code-compliance result is made.	

Formulas

$$E_{\text{output}} = \sum_i \text{kVA}_{\text{rated}} F_i \text{PF}_i h_i$$

$$E_{\text{core loss}} = \sum_i \text{fracP}_{\text{no-load}} h_i 1000$$

$$E_{\text{load loss}} = \sum_i \text{fracP}_{\text{full-load loss}} F_i^2 h_i 1000$$

$$E_{\text{input}} = E_{\text{output}} + E_{\text{core loss}} + E_{\text{load loss}}$$

$$\eta_{\text{all-day}} = \frac{E_{\text{output}}}{E_{\text{input}}} \times 100\%$$

Warnings and limitations

This is a time-weighted energy estimate from entered loss data. It does not infer transformer losses from kVA, select a transformer, verify temperature corrections, approve parallel operation, or prove code compliance.