

Transformer Harmonic Heating Calculator

Calculate total RMS current and a THD-weighted transformer stray-loss factor from fundamental current, current THD, base stray loss, and an entered weighting multiplier.

Generated October 10, 2026

<https://www.elecatrix.com/power-quality-transformers/transformer-harmonic-heating-calculator/>

Inputs

Input	Value	Unit
Fundamental current	100	A
Current THD	30	%
Base stray loss	500	W
Eddy weighting multiplier	2	x

Results

Result	Value	Unit
Harmonic RMS current	30	A
Total RMS current	104.4031	A
RMS heating factor	1.09	x
Weighted heating factor	1.18	x
Extra heating index	18	%
Adjusted stray loss	590	W

Calculation details

Detail	Value	Unit
Calculation basis	Entered THD is treated as harmonic RMS current relative to the fundamental and used for a simplified heating index.	
Harmonic boundary	Simplified THD screen only; harmonic order spectrum, K-factor, derating, temperature rise, and compliance review remain external.	

Formulas

Harmonic RMS current = Fundamental current x (THD percent/100)

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Total RMS current = $\sqrt{\text{Fundamental current}^2 + \text{Harmonic current}^2}$

RMS heating factor = $((\text{Total RMS current} / \text{Fundamental current}))^2$

THD ratio = $(\text{THD percent} / 100)$

Weighted heating factor = $1 + (\text{THD ratio}^2 \times \text{Eddy weighting multiplier})$

Adjusted stray loss = $\text{Base stray loss} \times \text{Weighted heating factor}$

Warnings and limitations

This simplified heating index does not rate a transformer, assign K-factor, prove temperature rise, verify IEEE/ANSI compliance, or replace manufacturer harmonic analysis.