

Transformer Losses

Electrical Engineering

Where a transformer's energy goes, and which bench test reveals each kind of loss.

Two standard tests separate the load-dependent losses from the constant ones.

Loss	Depends on	Revealed by
Copper, I^2R	Load current squared	Short-circuit test
Hysteresis	Flux and frequency	Open-circuit test
Eddy current	Flux, frequency squared	Open-circuit test
Flux leakage	Winding geometry	Short-circuit test
Dielectric	Insulation condition	Insulation testing

Educational reference. Efficiency peaks where copper loss equals iron loss, which usually falls well below full rated load.