Loss Factor from Load Factor and Annual Energy Losses

Load factor of a feeder or transformer from peak load and annual energy, the loss factor by the Buller-Woodrow relation and the annual energy lost from peak losses.

Method: Loss factor (Buller–Woodrow)

Input parameters

Unit system: SI

Parameter	Value	Unit
Peak load	2,000.0	kW
Annual energy delivered	9,000.0	MWh
Load losses at peak	60.000	kW
Loss factor coefficient (0.15–0.3)	0.30000	

Calculated results

Parameter	Value	Unit
Load factor	51.370	%
Loss factor	33.883	%
Annual energy losses	178.09	MWh
Equivalent full-loss hours	2,968.2	h
Losses as a share of energy delivered	1.9788	%

Notes for this case

• LsF = k·LF + (1 − k)·LF² (Buller–Woodrow); copper losses scale with the square of load, so the loss factor is lower than the load factor. Add no-load (iron) losses separately at 8,760 hours.

Formula and method

$$LF = \frac{E}{P_{pk} \cdot 8760}, \quad LsF = k\,LF + (1-k)LF^2, \quad E_L = P_{L,pk}\,LsF \cdot 8760$$

Variables

P_{pk}	Peak load	W
E	Annual energy delivered	J
$P_{L,pk}$	Load losses at peak	W
k	Loss factor coefficient (0.15–0.3)	-
LF	Load factor	-
LsF	Loss factor	-
E_L	Annual energy losses	J
h_{eq}	Equivalent full-loss hours	s
E_L/E	Losses as a share of energy delivered	-

Method and standards

Loss factor estimate.

Assumptions and limits

- Empirical relation; annual basis.

References

Loss factor (Buller–Woodrow)

Report details

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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/electrical/power/loss-factor-load-factor

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.