Rewound Motor Efficiency Loss: Extra Power and Cost

Extra input power and yearly cost caused by the efficiency lost when an induction motor is rewound, from load, original efficiency and the drop.

Method: Input-power difference from efficiency loss; Bureau of Energy Efficiency; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Shaft output (load)	37.000	kW
Efficiency before rewinding	92.000	%
Efficiency drop after rewinding (points)	1.5000	%
Running hours per year	7,000.0	h
Electricity price per kWh	8.0000	

Calculated results

Parameter	Value	Unit
Extra input power	0.66659	kW
Extra energy per year	4.6661	MWh
Extra cost per year	37,329	

Notes for this case

• Rewinding often lowers efficiency by 0.5–2 points, mainly from core damage when old windings are burnt out at too high a temperature and from changed winding geometry. Each point lost on a heavily used motor costs every year: compare that with the price difference between rewinding and buying a new, more efficient motor. Good rewind practice (controlled burn-out temperature, same wire and turns) keeps the loss small.

Formula and method

$$\Delta P = \frac{P}{\eta - \Delta\eta} - \frac{P}{\eta}$$

Variables

P	Shaft output (load)	W
η	Efficiency before rewinding	-
$\Delta\eta$	Efficiency drop after rewinding (points)	-
t	Running hours per year	s
c	Electricity price per kWh	-
ΔP	Extra input power	W
ΔE	Extra energy per year	J
ΔC	Extra cost per year	-

Method and standards

Rewound motor.

Assumptions and limits

- Same output before and after.

References

Input-power difference from efficiency loss, Bureau of Energy Efficiency, Energy Efficiency in Electrical Utilities (Guide Book 3)

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/motors/rewound-motor-efficiency-loss

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.