Engine Mechanical Efficiency and Friction Power

Friction power and mechanical efficiency of an engine from indicated and brake power, with the indicated thermal efficiency from the fuel heat.

Method: η_m = BP/IP; FP = IP − BP

Input parameters

Unit system: SI

Parameter	Value	Unit
Indicated power	62.000	kW
Brake power	50.000	kW
Fuel heat input (0 to skip)	147.60	kW

Calculated results

Parameter	Value	Unit
Friction power IP − BP	12.000	kW
Mechanical efficiency BP/IP	80.645	%
Indicated thermal efficiency	42.005	%

Formula and method

$$FP = IP - BP, \quad \eta_m = \frac{BP}{IP}, \quad \eta_{it} = \frac{IP}{\dot{Q}_f}$$

Variables

IP	Indicated power	W
BP	Brake power	W
$\dot{Q}_f$	Fuel heat input (0 to skip)	W
FP	Friction power IP − BP	W
η_m	Mechanical efficiency BP/IP	-
η_{it}	Indicated thermal efficiency	-

Method and standards

Definitions.

Assumptions and limits

- Steady running.

References

- η_m = BP/IP; FP = IP − BP

Report details

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Release checks	2 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/automotive/engine/engine-mechanical-efficiency

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.