Brake Power by Rope Brake Dynamometer

Brake torque and brake power of an engine from a rope brake test (dead load, spring balance reading, drum and rope diameters, speed).

Method: Rope brake: T = (W − S)g(D + d)/2; BP = 2πNT

Input parameters

Unit system: SI

Parameter	Value	Unit
Dead load (mass hung on the rope; force = W g)	60.000	kg
Spring balance reading (in kg, i.e. kgf; force = S g)	8.0000	kg
Brake drum diameter	0.80000	m
Rope diameter	20.000	mm
Engine speed	600.00	rpm

Calculated results

Parameter	Value	Unit
Brake torque (W − S) g (D + d)/2	209.08	N·m
Brake power	13.137	kW

Formula and method

$$T = (W - S)g\frac{D + d}{2}, \quad BP = 2\pi NT$$

Variables

W	Dead load (mass hung on the rope; force = W g)	kg
S	Spring balance reading (in kg, i.e. kgf; force = S g)	kg
D	Brake drum diameter	m
d	Rope diameter	m
N	Engine speed	1/s
T	Brake torque (W − S) g (D + d)/2	N·m
BP	Brake power	W

Method and standards

Statics.

Assumptions and limits

- Steady speed.
- Dead load and spring reading are entered as masses (kg, or the kgf the balance reads) and turned into forces with standard gravity.

References

- Rope brake: T = (W − S)g(D + d)/2; BP = 2πNT

Report details

Report reference	FCC-AEGD-HNXH (the same inputs always give the same reference)
Generated	17 November 2026, 19:46 UTC
Calculator	Brake Power by Rope Brake Dynamometer
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
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/brake-power-rope-brake

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.