Rim Pull, Drawbar Pull and Usable Traction

Rim pull or drawbar pull from engine power, drive efficiency and speed, and the usable pull that traction allows on the road surface.

Input parameters

Unit system: SI

Parameter	Value	Unit
Engine brake power	1,700.0	kW
Drive efficiency (about 0.85 mechanical)	85.000	%
Machine speed	12.000	km/h
Weight on the drive wheels or tracks	260.00	t
Coefficient of traction	0.60000	

Calculated results

Parameter	Value	Unit
Rim pull (or drawbar pull) from power	44,205	kgf
Usable pull limited by traction	156,000	kgf
Pull available (lower of the two)	433.50	kN
Speed below which the wheels would slip	3.4004	km/h

Notes for this case

- Engine power limits the pull at this speed.

Formula and method

$$RP = \frac{EBP \cdot EFF}{V}, \quad URP = C_T \cdot GWD$$

Variables

EBP	Engine brake power	W
EFF	Drive efficiency (about 0.85 mechanical)	-
V	Machine speed	m/s
GWD	Weight on the drive wheels or tracks	kg
C_T	Coefficient of traction	-
RP	Rim pull (or drawbar pull) from power	N
URP	Usable pull limited by traction	N
F	Pull available (lower of the two)	N
V_s	Speed below which the wheels would slip	m/s

Method and standards

Power-speed relation limited by traction.

Assumptions and limits

- Steady speed; manufacturers' rimpull curves include gear steps.

Report details

Report reference	FCC-JHJS-FV7Q (the same inputs always give the same reference)
Generated	23 November 2026, 17:26 UTC
Calculator	Rim Pull, Drawbar Pull and Usable Traction
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
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/civil/mine-design/rimpull-drawbar-usable-traction

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.