Mine Fan Operating Point on the Mine Characteristic

Air flow and fan pressure where a fan curve fitted through three points meets the mine characteristic p = R Q², with natural pressure, air power and shaft power.

Method: Peele (ed.); Mining Engineers' Handbook; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Fan curve point 1: flow	100.00	m³/s
Point 1: fan pressure	1,850.0	Pa
Point 2: flow	150.00	m³/s
Point 2: fan pressure	1,600.0	Pa
Point 3: flow	200.00	m³/s
Point 3: fan pressure	1,100.0	Pa
Mine resistance (N·s²/m⁸)	0.060000	
Natural pressure assisting the fan (negative opposing)	0	Pa
Fan efficiency	75.000	%

Calculated results

Parameter	Value	Unit
Operating air flow	159.42	m³/s
Fan pressure	1,524.9	Pa
Air power	243.10	kW
Fan shaft power	324.14	kW
Mine pressure drop	1,524.9	Pa

Notes for this case

- The fitted parabola is reliable only between the three fan points; use the maker's full curve and avoid the stall region left of the pressure peak.

Formula and method

$$p_f(Q) = c_0 + c_1 Q + c_2 Q^2 = R Q^2 - NVP, \quad P_s = \frac{p_f Q}{\eta}$$

Variables

Q_1	Fan curve point 1: flow	m³/s
p_1	Point 1: fan pressure	Pa
Q_2	Point 2: flow	m³/s
p_2	Point 2: fan pressure	Pa
Q_3	Point 3: flow	m³/s
p_3	Point 3: fan pressure	Pa
R	Mine resistance (N·s²/m⁸)	-
NVP	Natural pressure assisting the fan (negative opposing)	Pa
η	Fan efficiency	-
Q	Operating air flow	m³/s
p_f	Fan pressure	Pa

$p_f Q$	Air power	W
P_s	Fan shaft power	W
RQ^2	Mine pressure drop	Pa

Method and standards

Intersection of fan and mine characteristics.

Assumptions and limits

- Quadratic fan curve between the points.

References

- Peele (ed.)
- Mining Engineers' Handbook
- 3rd ed. (Wiley, 1941)
- sec. 14
- Mine Ventilation
- art. 15 (pressure-quantity characteristics of fans and mines) and art. 12 (natural draft)

Report details

Report reference	FCC-BS2V-DD0Q (the same inputs always give the same reference)
Generated	17 November 2026, 19:46 UTC
Calculator	Mine Fan Operating Point on the Mine Characteristic
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 17 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/mining-minerals/mine-fan-operating-point

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.