Air Separator Circulating Load and Efficiency

Circulating load, separator feed and tailings rates and recovery of fines from the fineness of separator feed, tailings and fines in a closed-circuit mill.

Method: Duda; Cement Data Book; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Separator feed passing the test sieve	65.000	%
Tailings (rejects) passing the sieve	55.000	%
Fines (product) passing the sieve	95.000	%
Fines (product) rate	15.000	t/h

Calculated results

Parameter	Value	Unit
Circulating load (tailings / fines)	300.00	%
Tailings rate	45.000	t/h
Separator feed rate	60.000	t/h
Recovery of fines in the feed to the product	36.538	%

Notes for this case

• Use the same sieve (or fineness measure) for all three samples taken at the same time. With residues instead of passing, enter 100 % minus the residue. Recovery is the two-product formula applied to the fines.

Formula and method

$$L = \frac{C - A}{A - B}, \quad G = LD, \quad F = (L + 1)D, \quad E = \frac{C(A - B)}{A(C - B)}$$

Variables

A	Separator feed passing the test sieve	-
B	Tailings (rejects) passing the sieve	-
C	Fines (product) passing the sieve	-
D	Fines (product) rate	kg/s
L	Circulating load (tailings / fines)	-
G	Tailings rate	kg/s
F	Separator feed rate	kg/s
E	Recovery of fines in the feed to the product	-

Method and standards

Two-product balance on the separator.

Assumptions and limits

- Steady state.

References

• Duda
• Cement Data Book
• Vol. 1
• 3rd ed. (Bauverlag / Macdonald and Evans, 1985)
• sec. 15.8 (air separator formulas) and Examples 15.1-15.2

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/chemical/cement/separator-circulating-load

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.