Filter Cake Pol Loss, Wash Water and Retention

Wash water, pol lost in filter cake per tonne cane, and the filter retention of suspended solids from mud and filtrate analyses (Hugot ch. 31).

Method: Hugot; Handbook of Cane Sugar Engineering; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Crushing rate	100.00	t/h
Filter cake per tonne cane	0.035000	kg/kg
Pol % filter cake Hugot: 1–2 % usually.	1.5000	%
Wash water per unit cake	125.00	%
Mud per tonne cane	0.20000	kg/kg
Insoluble solids in the mud	6.0000	%
Filtrate per tonne cane	0.21000	kg/kg
Suspended solids in the filtrate	0.50000	%

Calculated results

Parameter	Value	Unit
Wash water	4.3750	t/h
Pol lost in cake per tonne cane	0.52500	kg/t
Retention of suspended solids	91.250	%

Notes for this case

- Hugot: retention 48–88 %, about 70 %; 75–80 % is achievable with bagacillo at about 60 % of the insoluble solids.

Formula and method

$$\dot{m}_w = A\, w_w m_c, \quad L_p = m_c\, Pol_c, \quad R = 1 - \frac{m_f x_f}{m_m x_m}$$

Variables

A	Crushing rate	kg/s
m_c	Filter cake per tonne cane	kg/kg
Pol_c	Pol % filter cake	-
w_w	Wash water per unit cake	-
m_m	Mud per tonne cane	kg/kg
x_m	Insoluble solids in the mud	-
m_f	Filtrate per tonne cane	kg/kg
x_f	Suspended solids in the filtrate	-
$\dot{m}_w$	Wash water	kg/s
L_p	Pol lost in cake per tonne cane	kg/kg
R	Retention of suspended solids	-

Method and standards

Filter balances.

Assumptions and limits

- Steady operation.
- Mud, cake and filtrate are independent inputs; a note checks that mud plus wash water agrees with cake plus filtrate within 10 %, and another flags a negative retention.
- The insoluble solids x_m are those of the mud as sampled; take the sample before bagacillo is added, or the retention is overstated.

References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 31
- rotary filter performance
- pp. 476–480

Report details

Report reference	FCC-J3YA-V238 (the same inputs always give the same reference)
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Calculator	Filter Cake Pol Loss, Wash Water and Retention
Method last reviewed	13 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/sugar-ethanol/clarification/filter-cake-retention

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.