# Centrifugal Cleaner Stage Balance

Reject flow, accept consistency, mass and volume reject ratios and fibre loss of a stage of centrifugal (forward) cleaners from feed and reject data.

**Method:** Smook; Handbook for Pulp & Paper Technologists; ...

## Input parameters

Unit system: SI

| Parameter | Value | Unit |
|---|---|---|
| Feed flow | 1,200.0 | m³/h |
| Feed consistency | 0.80000 | % |
| Volumetric reject ratio | 15.000 | % |
| Reject consistency | 1.2000 | % |
| Stock density | 1,000.0 | kg/m³ |

## Calculated results

| Parameter | Value | Unit |
|---|---|---|
| Reject flow | 180.00 | m³/h |
| Accept consistency | 0.72941 | % |
| Mass reject ratio | 22.500 | % |
| Fibre to rejects (OD) | 51.840 | t/d |

**Notes for this case**

- Forward cleaners are run in cascade so the rejects of each stage are re-cleaned; only the last stage's rejects leave the system.

## Formula and method

$$\dot{V}_R = R_V \dot{V}_F, \quad C_A = \frac{\dot{V}_F C_F - \dot{V}_R C_R}{\dot{V}_F - \dot{V}_R}, \quad R_M = \frac{\dot{V}_R C_R}{\dot{V}_F C_F}$$

### Variables

| | | |
|---|---|---|
| $\dot{V}_F$ | Feed flow | m³/s |
| $C_F$ | Feed consistency | - |
| $R_V$ | Volumetric reject ratio | - |
| $C_R$ | Reject consistency | - |
| $\rho$ | Stock density | kg/m³ |
| $\dot{V}_R$ | Reject flow | m³/s |
| $C_A$ | Accept consistency | - |
| $R_M$ | Mass reject ratio | - |
| $\dot{m}_{R,OD}$ | Fibre to rejects (OD) | kg/s |

### Method and standards

Volume and fibre balances.

### Assumptions and limits

- Stock density constant across streams.

### References

- Smook
- Handbook for Pulp & Paper Technologists
- 3rd ed. (Angus Wilde, 2002)

- ch. 9.5 (centrifugal cleaning)

## Report details

| | |
|---|---|
| Report reference | FCC-M5H2-EZC8 (the same inputs always give the same reference) |
| Generated | 17 November 2026, 19:49 UTC |
| Calculator | Centrifugal Cleaner Stage Balance |
| 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/chemical/pulp-paper/centrifugal-cleaner-balance

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.