# Stock Consistency: Flow, Dilution and Thickening

Stock volume flow from OD production and consistency, and the water to add (or remove) to change consistency, by fibre and water balances (Smook).

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

## Input parameters

Unit system: SI

| Parameter | Value | Unit |
|---|---|---|
| Pulp production (oven-dry) | 500.00 | t/d |
| Present consistency | 4.0000 | % |
| Target consistency | 1.0000 | % |
| Stock density | 1,000.0 | kg/m³ |

## Calculated results

| Parameter | Value | Unit |
|---|---|---|
| Stock flow at $C_1$ | 520.83 | t/h |
| Volume flow at $C_1$ | 144.68 | L/s |
| Stock flow at $C_2$ | 2,083.3 | t/h |
| Water to add (+) or remove (−) | 1,562.5 | t/h |
| Volume flow at $C_2$ | 578.70 | L/s |

## Formula and method

$$\dot{m} = \frac{\dot{m}_{OD}}{C}, \quad \Delta\dot{m}_w = \dot{m}_{OD}\left(\frac{1}{C_2} - \frac{1}{C_1}\right)$$

### Variables

| | | |
|---|---|---|
| $\dot{m}_{OD}$ | Pulp production (oven-dry) | kg/s |
| $C_1$ | Present consistency | - |
| $C_2$ | Target consistency | - |
| $\rho$ | Stock density | kg/m³ |
| $\dot{m}_1$ | Stock flow at $C_1$ | kg/s |
| $\dot{V}_1$ | Volume flow at $C_1$ | m³/s |
| $\dot{m}_2$ | Stock flow at $C_2$ | kg/s |
| $\Delta\dot{m}_w$ | Water to add (+) or remove (−) | kg/s |
| $\dot{V}_2$ | Volume flow at $C_2$ | m³/s |

### Method and standards

Fibre balance.

### Assumptions and limits

- Stock density close to water.

### References

- Smook
- Handbook for Pulp & Paper Technologists
- 3rd ed. (Angus Wilde, 2002)
- ch. 9 (consistency: OD fibre as a share of stock mass)

## Report details

| | |
|---|---|
| Report reference | FCC-3VB6-NTA3 (the same inputs always give the same reference) |
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| Calculator | Stock Consistency: Flow, Dilution and Thickening |
| 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/stock-consistency-dilution

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.