Pulp and Paper Mill Water and Effluent KPIs

Specific water intake, effluent volume and BOD, COD and TSS loads per tonne of product from mill flows and effluent concentrations (Smook ch. 25–26).

Method: Smook; Handbook for Pulp & Paper Technologists; …

Input parameters

Unit system: SI

Parameter	Value	Unit
Production State the basis (air-dry tonnes ADt, oven-dry ODt or net saleable) and use the same basis as the benchmark or permit.	1,000.0	t/d
Fresh water intake	1,250.0	m³/h
Effluent flow	1,041.7	m³/h
Effluent BOD	30.000	mg/L
Effluent COD	150.00	mg/L
Effluent TSS	40.000	mg/L

Calculated results

Parameter	Value	Unit
Water intake per tonne	30.000	m³/t
Effluent per tonne	25.000	m³/t
BOD load per tonne	0.75000	kg/t
COD load per tonne	3.7500	kg/t
TSS load per tonne	1.0000	kg/t

Formula and method

$$w = \frac{\dot{V}_{in}}{P}, \quad \frac{BOD}{t} = \frac{\dot{V}_e c_{BOD}}{P}$$

Variables

P	Production	kg/s
$\dot{V}_{in}$	Fresh water intake	m³/s
$\dot{V}_e$	Effluent flow	m³/s
c_{BOD}	Effluent BOD	kg/m³
c_{COD}	Effluent COD	kg/m³
c_{TSS}	Effluent TSS	kg/m³
w	Water intake per tonne	m³/kg
e	Effluent per tonne	m³/kg
BOD/t	BOD load per tonne	kg/kg
COD/t	COD load per tonne	kg/kg
TSS/t	TSS load per tonne	kg/kg

Method and standards

Load definitions.

Assumptions and limits

- Daily averages.
- The per-tonne figures are on whatever production basis is entered (air-dry tonnes ADt, oven-dry ODt or net saleable product);

compare them only with benchmarks on the same basis.

References

- Smook
- Handbook for Pulp & Paper Technologists
- 3rd ed. (Angus Wilde, 2002)
- ch. 25 (mill water supply) and ch. 26 (effluent: BOD, COD and suspended solids)

Report details

Report reference	FCC-XVCC-JH3B (the same inputs always give the same reference)
Generated	17 November 2026, 19:49 UTC
Calculator	Pulp and Paper Mill Water and Effluent KPIs
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/mill-water-effluent-kpi

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.