Distillery Water Balance (ZLD): Fresh Water per kL

Fresh water per kilolitre of alcohol and per day from the water uses per kilolitre and the condensate recycled, and the recycle share.

Method: Water balance per kL of alcohol (m³ per kL)

Input parameters

Unit system: SI

Parameter	Value	Unit
Plant capacity (absolute alcohol)	100.00	kL/d
Dilution (process) water per kL	6.0000	
Cooling-tower make-up per kL	5.0000	
Boiler and utility make-up per kL	1.5000	
Condensate recycled per kL	6.5000	

Calculated results

Parameter	Value	Unit
Total water use per kL	12.500	
Fresh water per kL	6.0000	
Fresh water per day	600.00	m³/d
Recycle share	52.000	%

Formula and method

$$w_t = w_d + w_c + w_b, \quad w_f = \max(0, w_t - w_r), \quad \dot{V}_f = \dot{V}_e w_f$$

Variables

$\dot{V}_e$	Plant capacity (absolute alcohol)	m³/s
w_d	Dilution (process) water per kL	-
w_c	Cooling-tower make-up per kL	-
w_b	Boiler and utility make-up per kL	-
w_r	Condensate recycled per kL	-
w_t	Total water use per kL	-
w_f	Fresh water per kL	-
$\dot{V}_f$	Fresh water per day	m³/s
w_r/w_t	Recycle share	-

Method and standards

Water balance.

Assumptions and limits

- Steady operation.

References

- Water balance per kL of alcohol (m³ per kL)

Report details

Report reference	FCC-KBRF-E2RX (the same inputs always give the same reference)
Generated	17 November 2026, 19:50 UTC
Calculator	Distillery Water Balance (ZLD): Fresh Water per kL
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/spent-wash-zld/zld-water-balance

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.