Wet Scrubber Liquid-to-Gas Ratio and Make-Up

Liquid-to-gas ratio of a wet scrubber in L/m³, the recirculation flow for a target L/G, and make-up water for evaporation and blowdown.

Method: L/G = liquid flow/gas flow; make-up = evaporation + blowdown (water balance)

Input parameters

Unit system: SI

Parameter	Value	Unit
Gas flow (actual)	60,000	m³/h
Liquid recirculation flow	120.00	m³/h
Target L/G	3.0000	L/m³
Water evaporated (saturation of the gas)	1,500.0	kg/h
Blowdown	2.0000	m³/h

Calculated results

Parameter	Value	Unit
L/G	2.0000	L/m³
Liquid flow for the target	180.00	m³/h
Make-up water (evaporation + blowdown)	3.5000	m³/h

Notes for this case

- L/G per actual gas volume; makers quote it either per actual or per saturated outlet gas, so check which.

Formula and method

$$\frac{L}{G} = \frac{\dot{V}_l}{\dot{V}_g} \times 1000, \quad \dot{V}_{mu} = \frac{\dot{m}_e}{\rho_w} + \dot{V}_b$$

Variables

$\dot{V}_g$	Gas flow (actual)	m³/s
$\dot{V}_l$	Liquid recirculation flow	m³/s
$(L/G)_t$	Target L/G (L/m³)	-
$\dot{m}_e$	Water evaporated (saturation of the gas)	kg/s
$\dot{V}_b$	Blowdown	m³/s
L/G	L/G (L/m³)	-
$\dot{V}_{l,t}$	Liquid flow for the target	m³/s
$\dot{V}_{mu}$	Make-up water (evaporation + blowdown)	m³/s

Method and standards

Ratios and balance.

Assumptions and limits

- Steady operation.
- L/G is in litres per cubic metre of actual gas in every unit system.
- Drift (droplet carry-over) is not included in the make-up; add it to the blowdown if it is significant.

References

- L/G = liquid flow/gas flow; make-up = evaporation + blowdown (water balance)

Report details

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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/environmental/air-pollution/scrubber-liquid-gas-ratio

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.