Laboratory Fume Hood Exhaust from Face Velocity

Exhaust air flow of a laboratory fume hood from the sash opening and face velocity, the number of hoods, and the air changes this gives in the laboratory.

Method: Continuity Q = W H v_f

Input parameters

Unit system: SI

Parameter	Value	Unit
Sash opening width	1.5000	m
Sash opening height	0.50000	m
Face velocity Your safety standard's value; often about 0.4–0.5 m/s.	0.50000	m/s
Number of hoods	3.0000	
Laboratory volume	300.00	m³

Calculated results

Parameter	Value	Unit
Exhaust per hood	1,350.0	m³/h
Total exhaust	4,050.0	m³/h
Air changes per hour from the hoods	13.500	

Notes for this case

- Make-up air must match the exhaust; a variable-air-volume hood cuts flow when the sash is lowered.

Formula and method

$$\dot{V} = nWHv_f, \quad ACH = \frac{3600\dot{V}}{V_r}$$

Variables

W	Sash opening width	m
H	Sash opening height	m
v_f	Face velocity	m/s
n	Number of hoods	-
V_r	Laboratory volume	m³
$\dot{V}_1$	Exhaust per hood	m³/s
$\dot{V}$	Total exhaust	m³/s
ACH	Air changes per hour from the hoods	-

Method and standards

Continuity.

Assumptions and limits

- Uniform face velocity.

References

- Continuity Q = W H v_f

Report details

Report reference	FCC-417R-8MM0 (the same inputs always give the same reference)
Generated	17 November 2026, 19:46 UTC
Calculator	Laboratory Fume Hood Exhaust from Face Velocity
Method last reviewed	12 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/hvac/loads/fume-hood-face-velocity

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.