Air Changes per Hour (ACH) and Ventilation Airflow

Air changes per hour of a room from its size and the supply airflow, and the airflow needed for a target number of air changes.

Method: ACH = Q / V

Input parameters

Unit system: SI

Parameter	Value	Unit
Room length	20.000	m
Room width	10.000	m
Room height	4.0000	m
Supply (or extract) airflow	4,000.0	m³/h
Target air changes per hour	6.0000	1/h

Calculated results

Parameter	Value	Unit
Room volume	800.00	m³
Air changes per hour	5.0000	1/h
Airflow for the target air changes	4,800.0	m³/h

Formula and method

$$V = LWH$$
$$n = Q/V$$
$$Q_t = n_t V$$

Variables

L	length	m
W	width	m
H	height	m
Q	airflow	m³/s
n_t	target air changes	1/s
V	room volume	m³
n	air changes	1/s
Q_t	airflow for the target	m³/s

Method and standards

An air change is a volume of air equal to the room volume; the rate is airflow over volume.

Assumptions and limits

- Perfect mixing; constant room volume.

References

- ACH = Q / V

Report details

Report reference	FCC-NJB6-VF2E (the same inputs always give the same reference)
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Calculator	Air Changes per Hour (ACH) and Ventilation Airflow
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Software release	FireCAD Calc, release of 17 November 2026
Release checks	3 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/air-changes-per-hour

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.