Poultry House Ventilation Rate and Tunnel Air Speed

Minimum and maximum ventilation of a poultry house from bird numbers, live weight and rates per kg, fan count and the tunnel air speed over the birds.

Method: Ventilation per kg of live weight and tunnel air speed

Input parameters

Unit system: SI

Parameter	Value	Unit
Number of birds	10,000	
Live weight per bird	2.0000	kg
Minimum ventilation per kg (m³/h per kg)	0.70000	
Hot-weather ventilation per kg (m³/h per kg)	6.0000	
Capacity of one fan at working pressure	35,000	m³/h
House cross-section (width × average height)	33.600	m²

Calculated results

Parameter	Value	Unit
Minimum ventilation	14,000	m³/h
Maximum ventilation	120,000	m³/h
Fans for maximum ventilation	4.0000	
Tunnel air speed at maximum	0.99206	m/s

Notes for this case

• Ventilation is planned per kg of live weight: a small minimum rate in cold weather removes moisture, ammonia and CO_2, and a large hot-weather rate removes heat. In tunnel-ventilated houses the air speed over the birds (often 2–3 m/s for grown broilers) gives wind-chill cooling. Use the rates recommended for the breed, age and climate; fan capacity must be taken at the house's working static pressure.

Formula and method

$$\dot{V} = n\,w\,r, \quad n_f = \left\lceil \frac{\dot{V}_{max}}{\dot{V}_f} \right\rceil, \quad v = \frac{\dot{V}_{max}}{A_x}$$

Variables

n	Number of birds	-
w	Live weight per bird	kg
r_{min}	Minimum ventilation per kg (m³/h per kg)	-
r_{max}	Hot-weather ventilation per kg (m³/h per kg)	-
$\dot{V}_f$	Capacity of one fan at working pressure	m³/s
A_x	House cross-section (width × average height)	m²
$\dot{V}_{min}$	Minimum ventilation	m³/s
$\dot{V}_{max}$	Maximum ventilation	m³/s
n_f	Fans for maximum ventilation	-
v	Tunnel air speed at maximum	m/s

Method and standards

Poultry ventilation.

Assumptions and limits

- Rates per kg as entered.

References

Ventilation per kg of live weight and tunnel air speed

Report details

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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/civil/irrigation-farm/poultry-house-ventilation

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.