Internal Heat Gains: People, Lighting and Equipment

Sensible and latent heat gains in a room from occupants, lighting and equipment, from the per-person and per-area figures you enter.

Method: Sum of internal gains (ASHRAE Handbook—Fundamentals ch. 18 approach, user figures)

Input parameters

Unit system: SI

Parameter	Value	Unit
Number of people	12.000	
Sensible heat per person From a handbook for the activity; your figure.	0.075000	kW
Latent heat per person	0.055000	kW
Floor area	150.00	m²
Lighting power density	0.010000	kW/m²
Lighting use factor	100.00	%
Equipment power density	0.025000	kW/m²
Equipment diversity factor	75.000	%

Calculated results

Parameter	Value	Unit
People, sensible	0.90000	kW
People, latent	0.66000	kW
Lighting	1.5000	kW
Equipment	2.8125	kW
Total sensible	5.2125	kW
Total	5.8725	kW

Notes for this case

- Peak gains; a cooling load method spreads the radiant part over time.

Formula and method

$$\dot{Q}_s = n q_{ps} + A q_L F_L + A q_E F_E, \quad \dot{Q}_l = n q_{pl}$$

Variables

n	Number of people	-
q_{ps}	Sensible heat per person	W
q_{pl}	Latent heat per person	W
A	Floor area	m²
q_L	Lighting power density	W/m²
F_L	Lighting use factor	-
q_E	Equipment power density	W/m²
F_E	Equipment diversity factor	-
$\dot{Q}_p$	People, sensible	W
$\dot{Q}_l$	People, latent	W
$\dot{Q}_L$	Lighting	W

$\dot{Q}_E$	Equipment	W
$\dot{Q}_s$	Total sensible	W
$\dot{Q}_t$	Total	W

Method and standards

Sum of gains.

Assumptions and limits

- Peak instantaneous gains.

References

- Sum of internal gains (ASHRAE Handbook—Fundamentals ch. 18 approach, user figures)

Report details

Report reference	FCC-6DG3-1R5J (the same inputs always give the same reference)
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Calculator	Internal Heat Gains: People, Lighting and Equipment
Method last reviewed	12 November 2026
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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/hvac/loads/internal-heat-gains

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.