Staircase Risers, Treads and Going

Number of risers, riser height, tread (going) and the total going of a straight staircase from floor-to-floor height and a target riser, with the 2R + T check.

Method: Blondel's rule 2R + T (comfort check)

Input parameters

Unit system: SI

Parameter	Value	Unit
Floor-to-floor height	3.2000	m
Target riser height	165.00	mm
Tread (going) per step	270.00	mm

Calculated results

Parameter	Value	Unit
Number of risers (rounded)	19.000	
Actual riser height	168.42	mm
Total going (n − 1) T	4.8600	m
Comfort rule 2R + T	606.84	mm
Pitch of the stair	31.955	°

Notes for this case

- Rounding gives a riser of 168.4 mm, above the 165.0 mm target: add one riser if the target is a maximum.
- Building codes set limits on riser, going and pitch; check yours. A common comfort rule is 2R + T of about 550 to 700 mm.

Formula and method

$$n = \operatorname{round}\left(\frac{H}{R_t}\right), \quad R = \frac{H}{n}, \quad G = (n-1)T, \quad \tan\theta = \frac{R}{T}$$

Variables

H	Floor-to-floor height	m
R_t	Target riser height	m
T	Tread (going) per step	m
n	Number of risers (rounded)	-
R	Actual riser height	m
G	Total going (n − 1) T	m
$2R+T$	Comfort rule 2R + T	m
θ	Pitch of the stair	rad

Method and standards

Geometry.

Assumptions and limits

- Straight flight.
- The number of risers is the nearest whole number, so the actual riser can be a little above the target; the page warns then, and when 2R + T is outside 550–700 mm.

References

- Blondel's rule 2R + T (comfort check)

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/quantities/stair-riser-tread

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.