Column Load from Tributary Area

Axial load on an interior, edge or corner column from bay spacings, number of floors and floor loads, with service and factored loads.

Method: Tributary area method of load take-down

Input parameters

Unit system: SI

Parameter	Value	Unit
Full bay span in x (mean of the bays either side)	6.0000	m
Full bay span in y (mean of the bays either side)	5.0000	m
Column position Enter full bay spans: the page halves them for edge and corner columns.	Interior (full bay)	
Number of floors carried (including roof)	4.0000	
Dead load per floor area	5.0000	kPa
Imposed (live) load per floor area	3.0000	kPa
Load factor on dead load From your design code.	1.5000	
Load factor on imposed load	1.5000	

Calculated results

Parameter	Value	Unit
Tributary area per floor	30.000	m²
Service load	960.00	kN
Factored load	1,440.0	kN

Notes for this case

- Add the column self-weight, cladding and any live load reduction your code allows.

Formula and method

$$A_t = f L_x L_y, \quad P_s = n A_t (g + q), \quad P_u = n A_t (\gamma_g g + \gamma_q q)$$

Variables

L_x	Full bay span in x (mean of the bays either side)	m
L_y	Full bay span in y (mean of the bays either side)	m
$\mathrm{position}$	Column position	-
f	Share of the bay: 1 interior, 0.5 edge, 0.25 corner	-
n	Number of floors carried (including roof)	-
g	Dead load per floor area	Pa
q	Imposed (live) load per floor area	Pa
γ_g	Load factor on dead load	-
γ_q	Load factor on imposed load	-
A_t	Tributary area per floor	m²
P_s	Service load	N
P_u	Factored load	N

Method and standards

Load take-down.

Assumptions and limits

- L_x and L_y are full bay spans (centre to centre of columns). The edge and corner factors f = 0.5 and 0.25 do the halving: do not enter half-spans for edge or corner columns, or the load is halved twice.
- Simply supported load share.

References

- Tributary area method of load take-down

Report details

Report reference	FCC-EPS8-YFA0 (the same inputs always give the same reference)
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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/civil/steel/tributary-area-column-load

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.